SUC-SESSION

YOUR MAGAZIN FOR THE SINCLAIR SPECTRUM

- News
- The »ZX Diag Card«
- IDE Plus – Interface, Part 2
- Lambda 8300- Nearly a ZX81 clone
- Game: »Ninjakul 2: The Last Ninja«
- How to get a game on floppy disk
- Demos & Games 2019
- And much more ...

ISSUE

228.

OF YOUR MAGAZINE

FOR SUBSCRIBERS WITH SCENE+ DISK

THE NEWEST AND BEST PROGRAMS DIRECTLY DELIVERED TO YOU

EDITORIAL

Dear SUC readers,
the situation is really annoying .No, I don't mean the letter to the editor on page 3. It feels like the two hundredth lockdown, at least here in »Good Ol' Germany«, which is currently being extended until mid-April! My nerves are also, well, not exactly raw, but they are already pretty exposed. We are stuck in the situation! People have the feeling that it hooks so violently that it takes a tremendous kick to loosen this hook.
Nevertheless, the hope is that everything will ease up a bit by the middle of the year.
But I don't want to go into detail about Corona-Virus again.
This issue we present you again some new information about a not so new computer. In fact, the retro-computer scene is as lively as it can be. Although the Corona Virus and its mutated buddies are currently slowing down the usual life tremendously, there is always something new in the retro-scene. If you look at the various new additions, you'll see that they do things that are downright amazing. For example, I desperately wanted a »Diag Card« when my first Spectrum died. If you look at the »VGA Joy« interface or the SD card interfaces, you realize that these interfaces are at least twice as powerfull as the Spectrum ever was. It should be noted that the Spectrum already has more computing power than the Voyager space probes, which were launched in the 70s and are just leaving the solar system.
One more thing: we are still looking for someone who is willing to rebuild the Spectrum User Club website. The current website is aging and out of date. Besides, in this issue the Spectrum Next doesn´t get the attention as it should. Next users and owners may feel called upon to share their knowledge with us. Please contact us in large numbers! Thomas, myself and those who are working on this issue, can't do everything.
Future is bright! So let's make sure it stays that way!

Many greetings,
Joachim

April 9th, 2021

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IMPRINT

The SUC-Session magazine appears in German and English and can be subscribed together with the disk-magazine ***SCENE+*** at the ***»Spectrum-User-Club«.*** For further information please contact Thomas Eberle.

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<u>Copy deadline for SUC SESSION 229</u>

Sunday, July 18th, 2021

READERS LETTERS

Actually, the letters to the editor should be found here. Disappointingly, no letters to the editor have been received since the last issue.

This implies several things:

1. All readers of the SUC-Session have succumbed to the Corona-Virus.
2. The makers of the SUC-Session are much too good to have anything to say about it.
3. Our readers have succumbed to the Corona-Pandemic - but we already had that at point 1.
4. The ZX Spectrum in all its variations is finally dying - after all we are not the youngest anymore.
5. The readers of the SUC-Session are dying out. See point 4.
6. Commodore has taken over the world domination after all and banned all other computers.
7. Thomas Eberle has been sorting the readers' mail. The probability of this is 0% or ∞, depending on your point of view.
8. All ZX Spectrum computers including Next are busy trying to break PI's decimal place record, which of course takes quite a while because the Spectrum is not the fastest.
9. CRASH has taken readers away from us.
10. We, the makers, are much too bad at what we publish as a magazine for you, so that you are not interested.
11. The chief editor, that is me, is annoying you with his smug comments.
12. The Corona virus has taken you away - but we already had that in point 1 and 3.
13. the weather is sh...
14. annoyance, because the vaccination dates are so hard to get.
15. no time.
16. is it Christmas again?!
17. etc...

Of course, it is a pity that this time the letters to the editor has to be omitted. Maybe you didn't think of anything? Just as a hint: What is missing in this issue, and not only in this one, are articles about the ZX Spectrum Next. The Next was expected enthusiastically, the users were keen on the new computer. But so far there is no essential article in this issue that explains the Next or describes the Basic. I keep noticing that there is quite a bit in the TlienhardForum about the Next that should be in this issue. Some of those who post these articles also refer to the SUC-Session. Likewise, there are absolutely interesting contributions on the various websites that the users run, such as descriptions of interfaces or of programs that lift the Spectrum into the present day. However, none of this is to be found in the magazine unless one of the editors takes the trouble to delve into these topics and present his findings to the readers afterwards.

We have managed to publish the SUC-Session regularly and with some volume. After all, the issue was supposed to be a collaborative production and not just two people picking content out of your websites. Therefore the call, make your findings known to as many users as possible and therefore pass the texts on to us.

I would like to thank all those who have contributed to this booklet. You can find their names in the imprint. But I am afraid that it will not stay that way.

Finally, the reason why this pseudo-letter to the editor is not in the foreword: firstly, there is not enough space in the foreword, and secondly, I believe that it is more likely to reach you as a letter to the editor, but in the end there is at least something in the "Letters to the Editor" section.

Since you have persevered so far, I have one more request to make:

We need a contributor who has familiarized himself with the Next and can and will pass on his insights to us. The Next is not mentioned enough in the magazine. Thomas and I are busy in that Thomas has to run his company and I am busy with my new side job of co-writing a SF series. Against this background, it is difficult for us to deal with and discuss Next appropriately. It would be a pity if no one could be found who would take this in hand.

With this in mind.

Joachim Geupel

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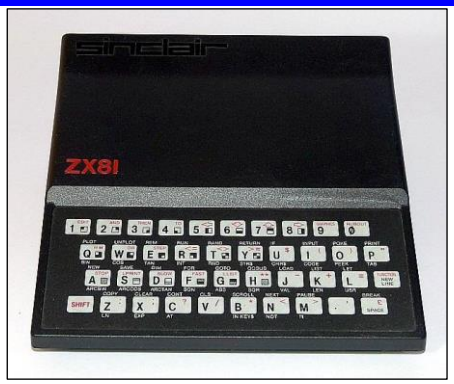
or

Joa.Geu@gmx.de

NEWS IN SHORT

HAPPY BIRTHDAY ZX 81



Yes, it is easy to calculate. The Spectrum's little brother (from whom you can still learn so much) has reached Swabian age (or so we say here). That means he's finally getting smart. I am curious.

SABOTAGE !

Who doesn't know them, the games "Saboteur I and II" on the Spectrum. Now "Saboteur!", a third part has been released, but not on the Spectrum, but for "Nintendo Switch", "Steam (PC)" and "Playstation 4/5". Versions for "Xbox One" and cell phones are still on the schedule. According to the screenshots, not much has changed, the Spectrum style has been retained, so the graphics also remain 'retro'. Programmer Clive Townsend has set up a website for it, where you can get the links to the individual SystemWebshops and buy the games individually or as a package. Here is the address:

http://www.clivetownsend.com/

NEXT HARDWARE AND ACCESSORIES

For the Next there are some new developments also in the hardware area. The store

https://store.activeconsult.co.uk/shop

offers joypads, cables, upgrades and external SD-Slots. just have a look.

N-GO BOARD

The second Kickstarter campaign for the Next is still running, but you can't buy a Next at the moment. But if you are happy with a replica, it is already available. The board is called "NGo" and is available as a pure board, but also built in with case and keyboard. It lacks the "Dickinson" style completely, but as far as I know it is a full-fledged replica and this for a reasonable price.

I'm not sure if the links to the stores that sell it trace back to the same person or if they are different people. Also I don't know who is the manufacturer then and who is the distributor. But I assume that this store in Portugal is the manufacturer:

https://ultimatemister.com/product/zxnextofficialcloneboard/

If you want to buy the device with case, you can get it here:

https://manuferhi.com/c/ngo

WONDERFUL DIZZY

Almost 30 years after the last official Dizzy title in 1992, the Oliver Twins had promised a new game for the Spectrum Next. This exclusive title for the Next-Backer (investors) has not yet been released, but as a by-product, the Spectrum 128k version came out in December for download or online play, completely free.

The title contains everything that excites Dizzy fans and both the original authors and the programmers who were already responsible for remakes have participated in it. You can find the game here:

https://yolkfolk.com/WonderfulDizzy/

»TOTAL COMMANDER« HELP WITH FILETRANSFER

BY THOMAS EBERLE

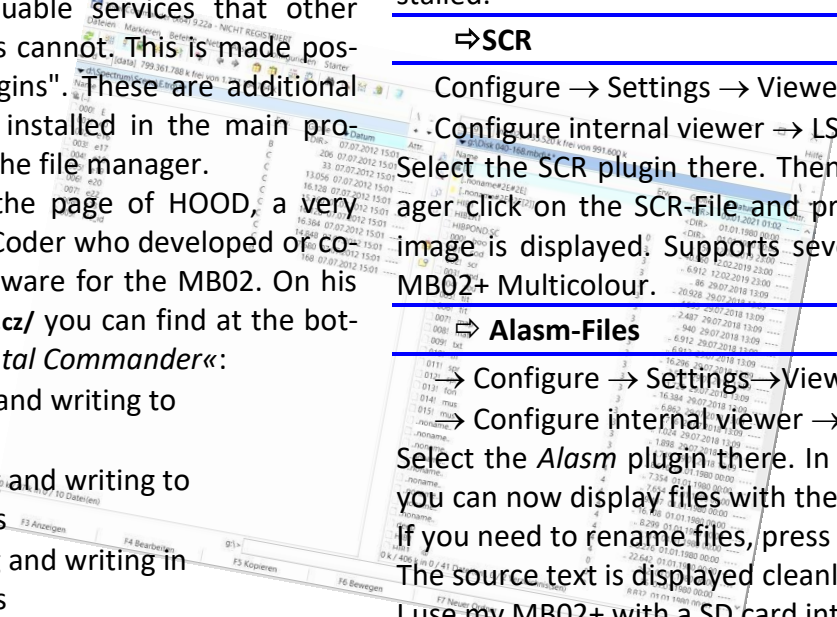
The *»Total Commander«* is a shareware file manager, very similar but better than the Windows Explorer. It is available in versions for different Windows systems (also very old ones) and Android. You can get the file manager at

https://www.ghisler.com/

But why am I writing about a PC program in a Spectrum magazine? Simply because the program provides me with valuable services that other Windows file managers cannot. This is made possible by so-called "plugins". These are additional programs that can be installed in the main program and thus extend the file manager.

I found the hints on the page of HOOD, a very well-known Spectrum Coder who developed or co-developed a lot of software for the MB02. On his page **https://hood.speccy.cz/** you can find at the bottom the plugins for *»Total Commander«*:

- TAP: For reading and writing to TAP directories
- MBD: For reading and writing to MB02 disk images
- MBH: For reading and writing in MB02 disk images
- TRD: For reading and writing in TRD disk images
- SCL: For reading and writing in disk images
- SCR: For viewing SCRFiles (Spectrum images)
  Alasm: Displays files of the assembler program "Alasm" as text file in Notepad.



TAP, MBD, MBH, TRD, SCL

The plugins are installed relatively simple:

⇨ Configure ⇨ Settings ⇨ Packer
⇨ Configure Packer Extensions.

There enter extension (TAP, TRD etc.) and then select the appropriate *WCX* files from the download. Confirm with »OK« and the plugin is installed.

⇨SCR

Configure → Settings → Viewer/Editor →
Configure internal viewer → LS-Plugins

Select the SCR plugin there. Then in the file manager click on the SCR-File and press F3, then the image is displayed. Supports several modes, also MB02+ Multicolour.

⇨ Alasm-Files

→ Configure → Settings→Viewer/Editor
→ Configure internal viewer → LS-Plugins

Select the *Alasm* plugin there. In the file manager you can now display files with the extension *»*.H«*. If you need to rename files, press *F3* and then *»4«*. The source text is displayed cleanly and in colour.

I use my MB02+ with a SD card interface.

SD card interface. I can insert the SD card into the PC and then read out individual spectrum files with Total Commander. In the same way I can copy files from a TRD image and then copy them to my MB02 SD card, which I then put back into the MB02 and voila... the programs still have to be rewritten, but are already on the system. I think this software is not only useful for someone who creates a Disk-Magazine. Great would be now still plugins for +D and Opus Discovery, but that is probably still future music.

Te

»ARCUS FORTH«

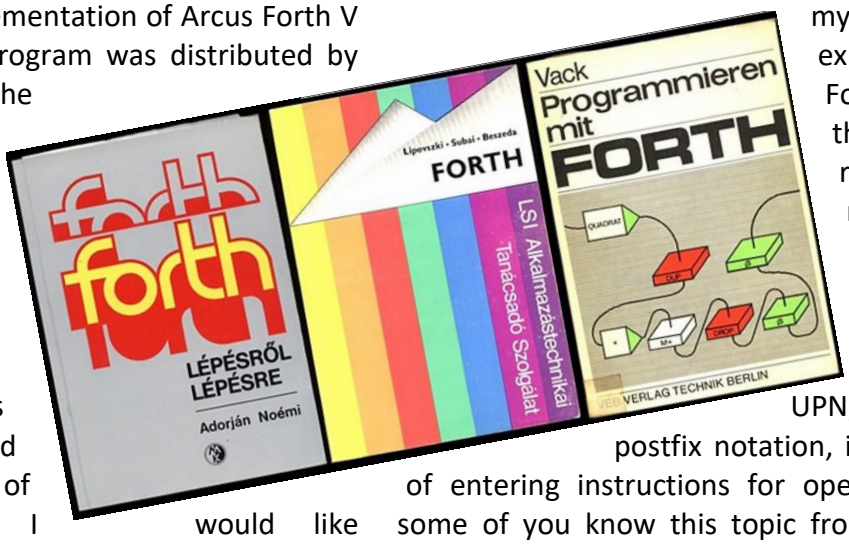
A PROGRAMMING LANGUAGE FOR THE ZX SPECTRUM

BY HARALD LACK

Dear fellow users and programming friends!!!

As you know, our Spectrum is a very versatile computer, which can be used for many different purposes. You only have to look at the individual projects in the forums to convince yourself of that. But the basic work on the computer is usually programming (the use of games and application programs we want to neglect here - even if it will be the main occupation of many computer owners). As far as the programming languages are concerned, most of the work was and is done in BASIC or Assembler. However, there are still a number of not uninteresting (high-level) languages for which there are also various Spectrum versions or implementations. One of them is Forth, which is little known and often neglected because of its peculi-

arities. Therefore I would like to deal a little with this language today and introduce it briefly on the basis of Arcus Forth. This contribution is not meant to be a programming course for Forth, that would go beyond the scope. The topic of my considerations is the implementation of Arcus Forth V 0.1 from 1987. This program was distributed by Michael Balig under the label Arcus Software, who was also the driving force behind the Forth movement at that time. Unfortunately he died in June 2020 and the Forth community is poorer by a recognized specialist. On the basis of this implementation I would like to go a little bit into the operation of this programming environment. This should give interested people the possibility to develop or even complete their knowledge in Forth.



First I would like to give some general, so to speak historical information about it. Forth itself was developed around 1970. The development of this language is attributed to Charles H. Moore and it is one of the imperative stack-oriented programming languages (sounds rather pompous, but it is the purely "technical" description). In our considerations we will see later (in a separate article) that Forth provides a development environment in the form of an editor, compareable with QBasic under DOS. During its development it was intended to call the language "Fourth", because it should run on the 4th generation of computers at that time. But Moore had the problem that the system he was working on only allowed file names with a maximum of five letters. So "Fourth" became "Forth". Moore had to stick to his own restrictions. Forth is very frugal concerning the memory requirements, and a complete Forth system can be accommodated in a few kilobytes. This was a requirement, because in these days the Memory for Computers was expensive. This of course makes Forth an ideal programming environment for the Spectrum, which is not blessed with abundant memory.

Those who are familiar with Forth will notice that the so-called stack is an essential element in Forth as the central function. Again and again terms like data stack and return stack will appear in the literature. Besides that you have to deal with registers, the dictionary (which can be divided into several vocabularies), jump tables and tokens. But this only as a side remark. I don't want to lose any readers at this point. What I have to report from my own painful experience is that Forth works with the so-called reverse Polish notation (UPN). Now some of you will ask, what is that again? The UPN, also called postfix notation, is a certain way of entering instructions for operations. Maybe some of you know this topic from the Hewlett-Packard pocket calculators like the HP 41CX which were very popular and widespread in the early 80s. I would like to explain it with a helpful example and think that this will make it easy to understand and therefore more transparent.

The numbers 5 and 9 are to be added. The human brain is close to a sequential processing here, because it calculates 5 + 9. With the UPN this is different. Here the instruction is 5 9 +.

At this point, the stack processing mentioned above, comes into play again. First, the two operands (5, 9) are placed on the stack one after the other, then the operator (+) fetches them from the stack, calculates the result and places it on the stack again. So the result is always on top of the stack. Last in - First out. All this is not complicated or miraculous, you just have to get familiar with it. In my school days in the 80th, we often had to deal with brackets in mathematics. Forth is very helpful here with the UPN, because it doesn't need brackets. It's a pity that we only find out about this now. Here again is a small explanatory example: Two numbers (3, 5) are to be added and then multiplied by a third number (2). In the sequential procedure, as we know it from the reality, it needs here already brackets, in order to be clear. We calculate/think thus: (3+5)*2 - and only by setting the parentheses we get the only logical result, namely 16. If we would not set parentheses and apply the axiomatically defined rule "dot before dash", we would get 13. With Forth, the input *»3 5 + 2 *«* is sufficient here to define everything clearly. Brackets not necessary!!! It is also often

said that the UPN represents the compact, bracket-free notation of propositional logic. Finally, it should be mentioned briefly that the UPN goes back to the Polish mathematician Jan Lukasiewicz, who developed it in the 20s of the last century, based on the notation of *Gottlob Frege*, 1879.

But let's get back to Forth. Further above I introduced the term of the Dictionary. This refers to the vocabulary of known commands contained in Forth. Analogous to the internal commands in *command.com* of a DOS system. So programming in Forth is fundamentally different from programming in BASIC or other languages that are not based on UPN. But of course this makes working with Forth interesting. Oh, by the way: Forth was further developed in the 70s by Xerox to a language named »Interpress«, which in turn developed into Postscript. So you could almost say that everyone who works with pdf files goes back to its roots in Forth.

Okay, let's end our excursion into the development history of Forth and get back to our actual topic.

Arcus FORTH is based on the so-called f.i.g. standard (Forth Interest Group). It offers a few words (commands) that go beyond the usual f.ig. standard, i will come back to this topic later. If you want to learn more about FORTH after this short overview (and I hope I could attract some interested people), please refer to the literature listed at the end. Those books should be available in the internet or at your local bookstore, there should be enough sources to be found. There are also certainly some references to Forth that can be found in the depths of the World Wide Web. Researching is worthwhile in any case.

I also would like to describe the handling of the included forth editor in more detail. This will follow soon in a separate article.

Recommended by Michael Balig for learning this language is book #4: (Leo Brodie, »Programmieren in FORTH«, Hanser Verlag)

It is quite well written but you should keep in mind, that in this book the author deals with the FORTH 83 standard. This is a newer standard compared to the f.i.g. FORTH, but the differences are marginal. Nevertheless, this should be mentioned here for information.

Arcus FORTH however is a Software particularly dedicated and customized to the ZX Spectrum. Therefore it has to adapt to the Spectrum-typical restrictions. Especially the adaptation of the source text division in the screens and the display of these screens by the Monitor must be pointed out here. Starting from the system address LIMIT, which is at the end of the disk buffer, the program places a 16 KByte RAM disk, in which 32 screens of 512 bytes each are accommodated. These are the screens 0 to 31. They have a size of 32 characters in 16 lines.

This is a violation of the f.i.g. standard of 64 characters per line, but the Spectrum screen resolution forces to reduce to 32 characters per line. While we are on the subject of screens, we should note a special feature right away. Screen 0 should only contain comment text, since no source code can be loaded from screen 0. Also the saving in this screen has a risk of imponderabilities, therefore you should write into another screen first, and then copy into screen 0. This is a more save way. I hope this will become a little more understandable later.

Arcus FORTH uses a Centronics printer as input/output device besides the keyboard/screen and the customary cassette recorder (adaptations to newer disk (memory) systems are possible). This printer is addressed via address 0DFH. However, it is possible to program further self-written device drivers via the words P$ and P! Likewise a Kempston compatible joystick query can be built up at this address. This is something for experts and should be mentioned here only in addition.

The version I used was released in June 1987 and was distributed as a public domain version. Surely some of you have wondered about the strange version number (V 0.1). This is because *Arcus FORTH* does not go the usual way with f.i.g. FORTH applications. *Arcus Forth* uses several routines from the ZX Spectrum BASIC ROM. Thus *Arcus Forth* does nothing different than e.g. Windows 3.X with PCs.

In the context of further developments of *ARCUS Forth* the following steps were planned:

Version 1.x

FORTH System which is only physically based on the BASIC system, but logically independent and therefore does not use ROM routines anymore.

Version 2.x

These versions are to be ROM-based FORTH systems, so Forth would be the operating system of the target computer.

Version 3.x

Here it should be already autonomous RAM systems, which are loaded only from a storage medi-

um (here best probably diskette) by means of a so-called "Urlader" into the memory.
To what extent this has been implemented I have not followed up. If anyone knows more of this, please get in contact with me.
Now we come to the additional words of the vocabulary of FORTH, which deviate from the standard or are not contained in this (no rule without exception):

- **.BASE ()**
  Specifies the currently valid number base more readable for us as a decimal number.
- **.DUMP (addr1 addr2 >)**
  Outputs the memory area between addr1 and addr2 (inclusive) hexadecimal and as character. This is a bit confusing at first.
- **.S ()**
  Outputs the allocation of the parameter stack in the form (address) (Inhalt). The address with the value 1 corresponds to the top of stack and so on.
- **.voc ()**
  Outputs the names of the vocabularies contained in the dictionary.
- **?PRINTER (> F)**
  Checks which output device is addressed or defined (printer (f=1) or the screen (f=0)).
- **?READY (b >)**
  Waits until the printer status is equal to byte b. If you impatiently press the BREAK key in the meantime, the program jumps to QUIT and resets the parameter stack.
- **ASCII (> c)**
  Immediately places the numeric value c of a character expected in the INPUT buffer on the top of stack (TOS). Example: The ASCII character "A" would put a 65 on the TOS.
- **BEEP (n1 n2 >)**
  Generates a tone of height n1 and length n2. Actually quite logical. Nothing more should be said about it.
- **BYE ()**
  Jumps (as the name suggests) back to the BASIC system.
- **C/L (> n)**
  Brings the length of an output line to the top of stack. The f.i.g. standard defines C/L as the length of an input line.
- **CASE (n > n)**
  Represents a CASE construct (compound statement). See the following example:

```
CASE n1 OF...(case 1)...ENDOF
 n2 OF...(case 2)...ENDOF
: .....................
 nk OF...(case k)...ENDOF
: ...(error case).......
ENDCASE
```

  During error handling, the input argument for CASE is still on the top of stack. This would allow an evaluation to help us if necessary. However, the word ENDCASE takes a value from the stack in any case if none of the previously defined cases applied. The error handling can be omitted with it also. However, if one of the defined cases occurs, the respective ENDOF branches after ENDCASE and the construct is exited.
- **CLEAR (n >)**
  Clears screen no. n.
- **CLS ()**
  Clears the screen.
- **CONSOLE ()**
  Defines the screen as output device (default).
- **COPY (n1 n2 >)**
  Copies screen n1 to n2.
- **CR ()**
  Is an auxiliary word for character output and should not be used.
- **EDIT (n >)**
  Calls the Full Screen Editor (see my next post) to edit screen n.
- **ENDCASE (n >)**
  See CASE
- **ENDOF ()**
  See CASE
- **Editor ()**
  Is the vocabulary for the non-top words of the editor.
- **FREE (> n)**
  Brings the number of free bytes between dictionary end and parameter stack to the TOS.
- **FREEZE ()**
  Creates a cold start parameter with the current dictionary state and thus freezes the last given definitions, i.e. the current system state, or protects against the cold start procedure. So it is possible to save a new version (with the current state). However, in order to do this successfully, the current size of the dictionary must first be determined using the SIZE U. command. Afterwards you leave the Forth system with the command BYE. The value of the dictionary just determined is now

assigned to the BASIC variable size. After that you can save the new version with GO TO 10.

- **HEADER ()**
  Transfers a file name of maximum 10 characters from the current INPUT buffer and stores it at address HERE. See also the commands SAVETAPE, LOADTAPE, SAVESCREENS, LOADSCREENS.
- **IS (addr >)**
  Outputs the vocabulary name for the given address. Used in the following form:
- **CONTEXT IS, CURRENT IS**
  VOC LINK IS, J (> n)
  Brings the index of an outer LOOP to the top of stack.
- **K (> n)**
  Brings the index of a second outer LOOP to the top of stack.
- **LEAP (>)**
  Exits immediately (without ifs and buts) from a LOOP loop. But CAUTION!! Cannot be used in nested LOOPs.
- **LINK (> addr)**
  Is a variable and can take the values 0 or 1. It contains 0 if the screen and 1 if the printer is set as output device.
- **LEFT EDGE (n >)**
  Outputs a Left Margin setting to an Epson compatible printer. Outputting to the screen (instead of the printer) usually results in an error or even a system crash. So watch out!!
- **LIST (n >)**
  Outputs the screen n. This is done differently for screen output than the standard without line no. in order not to distort the print image with 32 characters per line both in the screens and on the screen. When outputting to the printer, the line numbers are printed naturally.
- **LOADSCREENS ()**
  Reads in a screen file in the way it was output (scope and screen no.). The name of the file must be in the current INPUT buffer (e.g. "LOADSCREENS XYZ").
- **LOADTAPE (addr >)**
  Load a byte file, which can also be a screen file, from the address addr. The name of the file must be in the INPUT buffer.
- **LTAPE (addr >)**
  Reads a bytefile from the cassette. The parameters (headers) must be stored in the Spectrum Standard Format starting from the address addr.
- **LX 86 (c >)**
  Outputs the byte c via Centronics printer.
- **NOOP ()**
  Has no effect (no operation).
- **OF (n1 n2 ->)**
  See CASE
- **P$ (b1 > b2)**
  Reads the byte b2 at the input port with address b1.
- **P! (bl b2 >)**
  Outputs the byte b1 via the port with address b2.
- **PRINTER ()**
  Specifies the printer as the output device.
- **SAVESCREENS (n1 n2 >)**
  Saves n2 screens from screen n1 to cassette (Attention: Recording starts immediately without prior query as known from the BASIC interpreter). The name of the file must be in the INPUT buffer.
- **SAVETAPE (addr n >)**
  Saves n bytes from address addr to cassette (immediate start - see above). The name of the file must be in the INPUT buffer.
- **SHOW (n1 n2 >)**
  Prints the screens n1 to n2 on the printer.
- **SIZE (> n)**
  Places the number of bytes occupied by the Arcus FORTH program system on the top of stack.
- **STAPE (addr >)**
  Stores the bytes on cassette.
- **THRU (nl n2 >)**
  Loads the screens from n1 to n2 inclusive (the word > (arrow) must not be contained in them, except in screen n2, from which it is then to be loaded in sequence).
- **ZNR (n >)**
  Outputs n three digits followed by a space.
- **\()**
  A backslash marks the rest of the cell as a comment.

So far for the deviations from the *»f.i.g. standard«*. Finally now to the books mentioned at the beginning which Michael recommends for further reading for all those who would like to deal with Forth in more detail.

1. Ronald Zech
   The FORTH Programming Language
   (Franzis Verlag)
2. Charles E. Eaker
   The Case Statement
   FORTH Dimensions
3. Leo Brodie
   In FORTH denken
   Hanser Verlag)
4. Leo Brodie
   Programmieren in FORTH
   Hanser Verlag
5. Andreas Goppold/Roger Bouteiller
   FORTH ein Programmiersystem ohne Grenzen
   (Edition Aragon)

Further information in the relevant sides of the World Wide Web!!!

So much for my short overview about the peculiarities of Arcus Forth. In the following article we will talk about the Full Screen Editor. As I said, I didn't want to give a Forth programming course here, but only describe Arcus Forth in more detail, so it would be nice if someone who knows Forth could be found, who would offer a programming course on this quite interesting language. Until then have fun with Arcus-Forth.

THE DIVIDE PLUS - PART 2 - THE SOFTWARE

VON SCOTTFALK HÜHN

General

To communicate with the connected IDE devices the DivIDE Plus needs software, which is mostly called firmware here. When the DivIDE Plus was produced, 5 firmwares are already preinstalled, which can be selected via I/O port 23 according to the following pattern:

OUT 23,x

The parameter x corresponds to a value between 0 and 191. This value selects the desired memory area (and thus the desired firmware) and also determines the required memory configuration. After selecting a firmware with the OUT 23 command, it may be useful to perform a firmware reset. This is always recommended when a firmware is started for the first time and after each change of the IDE device or the memory card. Important: Do not use the reset button of the Spectrum for this! This would reset the setting on I/O port 23 and the DivIDE Plus will restart with the default setting (in this case with FATware). A reset after an OUT 23 command should always look like this:

PRINT USR 0

After this command the Spectrum restarts with the previously selected firmware and also performs an initialization. With the 128k models, the Spectrum is in 48k mode after the reset, but with the difference that the 128k memory management is still active and thus most 128k programs still run (USR 0 mode). By the way, the simple DivIDE also has this peculiarity.

Preinstalled firmware

OUT 23.0: FATware 0.12

FATware was the most popular firmware on the simple DivIDE for a long time and probably for this reason it was installed on the DivIDE Plus in the first memory area. This has the peculiarity that it becomes active on power up or after pressing the reset button on the Spectrum. In short: The DivIDE Plus behaves exactly like the simple DivIDE after switching on the power supply and starts FATware. Thus, the OUT 23,0 command to select FATware is rather rarely needed.

FATware can read files from all IDE devices that contain at least one partition with the FAT file system. FAT32 is not readable and this means that a partition can only be a maximum of 2GB in size. However, it is possible to divide large volumes into

several partitions of 2GB each, and FATware can manage up to 8 partitions.
Unfortunately FATware has not really been developed further and does not contain any functions for saving files even in the last version 0.14a3. But FATware is the best choice as a fast program starter: You copy your favorite programs (TAP, SNA, Z80 and SCR are supported) to a CF card with your PC and then insert it into the DivIDE Plus. This way you have a large library available almost immediately. Subdirectories can be created for a better overview and even long file names are no problem.
When the Spectrum is turned on, a startup screen with the DivIDE logo appears briefly, followed by the normal Spectrum screen. However, this only happens at the first start. Due to the battery buffering of the RAM, FATware remembers the last setting and therefore also the connected IDE devices. If the IDE configuration changes (e.g. by inserting another memory card), then a new IDE search should be started. This is achieved by holding down the space bar when starting (or resetting) the Spectrum. FATware then displays the IDE devices found and determines the number of partitions (volumes). The Spectrum then starts in USR 0 mode by pressing any key.
The most important control element in FATware is the NMI button: Pressing it starts the Disk Browser, which can be used to navigate through the directory structure of the connected IDE disks and to start selected programs. The file types SNA, Z80 and SCR are immediately loaded into the Spectrum and started or displayed. With TAP, the Spectrum screen first reappears as it was before the NMI button was pressed. However, FATware remembers the selected file and with the next LOAD "" command the file is loaded and started. Recommended for the selection of TAP files is the key combination SYMBOL SHIFT + ENTER. Here a possibly still running program is terminated by a reset, so that one can enter the LOAD "" command directly afterwards.
The following overview shows all important functions of FATware at a glance:

- **NMI button:** starts the Disk Browser
- **Arrow up (CAPS SHIFT + 7**): move cursor up in the list
- **Arrow down (CAPS SHIFT + 6):** move cursor down in the list
- **ENTER:** select the marked element
- **BREAK (CAPS SHIFT + SPACE):** exit the disk browser without changing anything
- **EDIT (CAPS SHIFT + 1):** select another partition or drive
- **SYMBOL SHIFT + ENTER:** remember TAP file and perform reset
- **SYMBOL SHIFT + R:** Execute reset

Another note for the Spectrum 128k/+2/+2A/+3: Snapshots (Z80 and SNA) from a 128k program can be loaded directly without any special preparations. To load TAP files directly in 128k mode, one must proceed as follows:

1. Mark the desired TAP file in the disk browser
2. SYMBOL SHIFT + ENTER: Mark TAP file and restart Spectrum
3. OUT 32765,0: Spectrum starts with 128k menu if not:
4. press RESET button

The Spectrum is now waiting for an input in the 128k menu. Here the cursor is already on "Tape Loader" or "Loader" and with ENTER the loading process can be started directly in 128k mode.

OUT 23.2: DEMFIR d0.7b

The firmware DEMFIR (DTP's Emulator Files Runner) has a similar functionality as FATware, i.e. it is used to quickly start programs in the formats TAP, TZX, SNA, Z80, MFC and SCR. As with FATware, the NMI button is used to call up the operating menu. However, no disk or file browser appears here at first, but an overview of the functions and the connected IDE devices. DEMFIR also differs from FATware by a completely different access to the IDE devices: DEMFIR cannot read a FAT file system and expects a CD-ROM or DVD drive with a CD in ISO 9660 format.
Alternatively, however, a hard disk or CF card can be used on which CD images in ISO format are stored. These must not be fragmented, however, because DEMFIR reads these images like a CD and expects a corresponding continuous data structure. The size of a CD is standardized and is 700MB maximum, but you can store several CD images on one IDE medium, so there should be no limit to the size of the IDE medium.
After pressing the NMI button, the possible menu functions are displayed, where a function is triggered by pressing the inverted initial letter. The following list briefly describes the possible menu functions:

- **D(evice):** switches between IDE master and IDE slave

- **M(edium):** scans according to ISO 9660 media
- **R(eset):** execute reset (USR 0 mode)
- **I(nit):** starts a new device search
- **Q(uit):** exit the NMI menu
- **F(ind):** searches for ISO images on the medium
- **S(ector):** enter a sector position for an ISO image
- **V(ram):** display and switch the image memory
- **P(aging):** Switch off 128k memory management (switch to 48k mode)
- **C(heat):** lists POK files and shows cheat possibilities
- **ENTER:** starts the file browser

Before you can work with DEMFIR, some work is needed. There is only a part of the firmware in the ROM of the DivIDE Plus, another part has to be installed in RAM with a special boot CD (or boot image). This procedure has to be done only once and if it is needed at all can be seen on the NMI screen: On the top right there is the version number "d0.7b" and if this is shown in green, then the complete DEMFIR firmware is already installed. If the version number appears red, then the missing part still has to be installed.

For the installation the archive file "demfird0.7b.tar.gz" is loaded from the DEMFIR homepage [http://demfir.sourceforge.net] and if you extract it, you will find the required boot image as file "demfird07b.iso". This file is copied as first file to an empty CF card, so it is located at the beginning of the disk and is not fragmented. With this CF card the Spectrum is now started, the firmware DEMFIR is activated (OUT 23,2) and the NMI button is pressed. The menu function I(nit) starts an IDE search and the CF card should be recognized. Last press F(ind) and DEMFIR will search for the first ISO image. A few seconds later this should be found and almost simultaneously the version number "d0.7b" turns green - DEMFIR has automatically reloaded and installed the missing part from the image.

Now it is possible to press ENTER to call the File Browser and browse the contents of the ISO image. However, the boot image contains only 3 files with the DEMFIR system, with which one cannot do much at this point. However, it is possible with relatively little effort to create your own ISO image with your favorite programs:

You need a CD burning program that can create CD images, e.g. NERO. With it you start a new CD project as CD-ROM (ISO). Here you can insert all desired programs and files in the formats TAP, TZX, SNA, Z80, MFC and SCR into the project, whereby you can also use long file names and directories. Furthermore you should assign a CD name, this will be displayed later in DEMFIR. If the compilation is complete, select the "Image Recorder" and start the burning process. Afterwards the created ISO file is copied to an empty CF card, but you can take the card that already contains the boot image. The new file is then located on the CF card directly behind the boot image.

The Spectrum is now switched on and the firmware DEMFIR is activated with OUT 23,2. After pressing the NMI button you can start an image search via the menu functions I(nit) and F(ind). If the memory card still contains the boot image from the installation, then of course this image is found first. In this case press F(ind) again, the search continues and finally finds the new image with our favorite programs. Pressing ENTER will now jump to the file browser and here you can comfortably move through the entire data structure of the CD image. The following keys can be used:

- **Arrow up (7):**
  move the cursor up in the list.
- **Arrow down (6):**
  move the cursor down in the list
- **Arrow left (5):**
  Move cursor to the top of the page or to the previous page
- **Arrow right (8):**
  Move the cursor to the end of the page or to the next page.
- **ENTER:**
  Start snapshot, for TAP and TZX show content
- **SYMBOL SHIFT + ENTER:**
  Set loading position for TAP and TZX
- **space bar:**
  Exit File Browser

All other keys can be used for searching. For example, after pressing the "H" key, the cursor is placed on the first entry beginning with "H", distinguishing between upper and lower case. The dot (SYMBOL SHIFT + M) can be used to set the cursor to the beginning of the list. The straight stroke (SYMBOL SHIFT + S) leads to the end of the

list. Pressing a function key (5-8, ENTER) terminates the search mode again.
DEMFIR has even more to offer, but I don't want to describe all functions in detail now. For example, there is a cheat manager that can read and process POK files and smaller details like different cursor colors have not been mentioned yet. But there is one thing I want to point out: DEMFIR remembers all settings, so that after a time-out of the Spectrum you will find everything again as you left it.
A little hint: After a successful search the line M(edium) shows the position of the image on the disk. The hex number before the slash is the sector number where the image starts and should be noted. If you have problems, you can use the S(ec) option to enter the number directly and avoid the possibly time-consuming search.
I would like to mention that DEMFIR is the perfect firmware if you have a CD-ROM or DVD drive connected to the DivIDE Plus. An inserted CD is recognized directly at the I(nit) and can be used immediately.

OUT 23.4: +DivIDE

This firmware is intended for those who are familiar with the Plus-D disk interface and now want to switch to a more contemporary storage medium. With +DivIDE you have the possibility to place a complete Plus-D disk archive on an IDE disk or CF card, with read and write access.
As a quick reminder, the Plus-D was manufactured by MGT (Miles Gordon Technology) and was quite a popular floppy interface in Western Europe. It has a compact design and allows the connection of 2 DD floppy disk drives (3.5" or 5.25"). The floppy disks have a storage capacity of up to 800kB, with 780kB available for data. A printer with Centronics interface can also be connected to the Plus-D. Furthermore, an NMI button is available, with which the currently running program or the displayed image can be saved as a snapshot.
+DivIDE represents an emulation of the Plus-D interface. Instead of the real floppy drives, there are 2 virtual drives here and virtual floppy disks can be inserted into these in turn. For the administration of the virtual diskettes +DivIDE uses no file system and accesses directly the sectors of the connected IDE disks. In each case 1600 sectors are combined to a virtual disk. Altogether up to 65535 virtual disks are possible, so that IDE/CF disks with a capacity of up to 50GB can be used.
The direct sector access has however a large disadvantage: An already existing file system on the IDE/CF data medium is destroyed with the use of +DivIDE and finally only the Spectrum can access the data. Thus, data exchange with a PC is not possible. I gave some thought to this problem and found a workable solution. The goal was to make an IDE data medium (in this case a CF card) usable for both the Spectrum and the PC. For this purpose the PC program "+divide Manager" was developed, which makes the virtual disks on the CF card visible and allows a data transfer. For further information I refer to my homepage [https://s-huehn.de/spectrum/software.htm#+divide],
where the program is described in detail.
Back to the firmware +DivIDE: Because of the different hardware of Plus-D and DivIDE Plus there are some differences in the emulation. For example, all print routines and the microdrive syntax have been removed to save memory. For this the booting of a system file as in the original is not necessary, after switching on the Spectrum and activating with OUT 23,4 you can immediately work with +DivIDE.
In contrast to the simple DivIDE it is even possible to work in 128k BASIC on the DivIDE Plus. For this you should remember the following procedure:

1. press reset button (bring Spectrum into a defined state)
2. OUT 32765,0: Spectrum starts with 128k menu, if not: repeat Reset
3. Select 128k BASIC
4. OUT 23,4: Activate +DivIDE firmware (enter character by character in 128k editor)

Afterwards you can work in 128k BASIC and also access the functions of +DivIDE. The procedure to switch to the 128k mode is unfortunately a bit cumbersome, but it will allow the unrestricted use of all resources of the Spectrum 128k in BASIC. Of course, the programs created in 128k mode can also be saved to a virtual floppy disk using the SAVE command. By the way, +DivIDE is the only firmware I know of that can work in 128k BASIC.
The most important command for the +DivIDE firmware is the following:

- **GO TO *d;m,n:**
  the semicolon can also be written as a comma: ***GO TO *d,m,n***

With this command you insert a virtual floppy disk into one of the two virtual drives of the emulated Plus-D. The letters mean the following:
d: the (virtual) floppy drive (1 or 2)

m: indicates on which IDE drive the virtual floppy disk is located (0 means master and a number greater than 0 means slave)

n: corresponds to the virtual floppy disk number (0-65535)

Two examples should show the correct use of this command:**GO TO *1,0,17:**
disk 17 on the IDE master is inserted into drive 1

- **GO TO *2,1,139:**
  disk 139 on the IDE slave is inserted into drive 2

But be careful - a small typing error can cause big damage. Before you execute a SAVE, you should make sure with a CAT 1 or CAT 2 that you have inserted the correct virtual disk. Also you should remember well, which virtual disks are currently used, because this is not indicated later anywhere. Maybe Rudy Biesma (the developer of +DivIDE) reads this article and adds something. Suggestion: Display the disk number of a CAT in the title bar.
For loading and saving programs and data with +DivIDE the known commands of the Plus-D system (GDOS) can be used. Please do not forget, at first you should insert virtual floppy disks into the drives with the GO TO command. Here is an exemplary list with the most important commands:**CAT 1:**
displays the detailed content (catalog) of drive 1

- **CAT *:**
  shows the detailed content of the last used drive
- **CAT 2: :**
  shows the simplified content (file names only) of drive 2
- **CAT *!:**
  displays the simplified content of the last used drive
- **SAVE d2 "Test":**
  saves the BASIC program "Test" on drive 2
- **SAVE d*"Test2":**
  saves the BASIC program "Test2" on the last used drive
- **LOAD d1 "Prog":**
  loads the BASIC program "Prog" from drive 1
- **LOAD d*"Bytes" CODE:**
  loads the code block "Bytes" from the last used drive
- **LOAD p5:**
  loads the program number 5 from the catalog
- **ERASE d1 "Prog":**
  deletes the file "Prog" from drive 1
- **ERASE d2 "Grafik" TO "Bild":**
  renames the file "Grafik" on drive 2 to "Bild
- **FORMAT d2:**
  formats the virtual floppy disk in drive 2

Furthermore there are commands like OPEN #, CLOSE # and MOVE to manage streams and a special SAVE @ and LOAD @ to write and read single sectors. Here I refer for more information to the Plus-D manual, which can be downloaded from the 8-bit wiki

[http://www.8bit-wiki.de].

Some programs that use special system functions may not run under +DivIDE. This applies e.g. to disk copy programs, however on the +DivIDE homepage

[https://www.biehold.nl/rudy/divide/index.htm]

an adapted copy program "D48" is available for download. Also not all hook codes are supported, which can cause problems with machine code calls of Plus-D functions.
Unfortunately also a peculiarity of the original Plus-D system is emulated: Occasionally, occupied sectors on the disk are overwritten during SAVE, which unfortunately is not noticed immediately. This can be prevented by typing the following before saving:

CLEAR #

This closes all open streams and channels and obviously also updates some important system variables, so that during a SAVE really free sectors are written to.
About the NMI button: This emulates the snapshot button of the Plus-D. If you press it, the running program stops. In addition, colored lines appear in the border area to indicate this special status. The following button options are available at this point:

»3«: saves the screen as a SCREEN$ file on the last used drive.

»4«: saves a complete 48k snapshot on the last used drive

»X«: returns to the normal program

It is also possible to save to the alternate drive by pressing CAPS SHIFT to the "3" or "4" key in addition. Unfortunately, the NMI button does not work in 128k mode. It does trigger the NMI and the coloured lines also appear in the border area, but further actions cause the entire system to crash. However, this is the only limitation of the 128k mode that I noticed.

By the way, all settings of +DivIDE are preserved when the Spectrum is switched off. So the next time the system is started, the same virtual disks are still inserted.

OUT 23.6: MDOS3 1/20/2006

I have not dealt much with this firmware, because the original floppy system is nearly unknown in Germany. MDOS3 is an emulation of the MDOS/MDOS2 system, which is mainly used in eastern Europe and is used on the Didaktik system. It uses 4 virtual floppy drives and works with image files in MD3 format, which are stored on an IDE disk. With this firmware, it is mandatory that an MD3 image is present as first file of the IDE/CF Card, so that a start is possible at all. For testing, the file "mdos3-images.zip" can be loaded from the Velesoft homepage

[https://velesoft.speccy.cz/zx/divide/divide-mdos3.htm],

which contains an MD3 image with some virtual disks and this is copied onto an empty CF card. After switching on the Spectrum and activating MDOS3 with OUT 23,6 the start is done with:

[https://velesoft.speccy.cz/zx/divide/dividemdos3.htm]

which contains an MD3 image with some virtual disks and this is copied onto an empty CF card. After switching on the Spectrum and activating *MDOS3* with OUT 23,6 the start is done with:

PRINT USR 0

This executes a reset and MDOS3 starts searching for IDE devices. After displaying the found devices the next search for an MDOS3 image starts. If this search was also successful, then a menu appears where you simply confirm the suggested selection "MDOS3 type1" with ENTER. Afterwards the Spectrum restarts and is now ready to work with *MDOS3*.

The NMI function is also important with this firmware. An overview of the 4 virtual floppy drives and their settings appears here. Pressing the "H" key shows all the options that are possible in the NMI menu. For example, the keys "A" to "D" can be used to insert virtual floppy disks into the drives A: to D:. It is even possible to insert real floppy drives (if available) with the keys "1" to "4".

When selecting a virtual floppy disk with "A", first the partition and a search mask are requested. Both can be confirmed first with ENTER and a list with all found virtual floppy disks appears. With the arrow keys up and down a small cursor can be moved and the selection is confirmed with ENTER. Afterwards the overview of the floppy drives appears again and the selected virtual floppy disk is now located in drive A:. At this point you can leave the NMI menu with "Q" directly or with "R" via a reset.

Here is a small exemplary selection of commands that can be used in BASIC

- **CAT:**
  displays the contents of the current drive (defaults to A:)
- **CAT "b:":**
  shows the content of drive B:
- **CAT "*.b":**
  shows all BASIC programs from the current drive
- **SAVE *"prog":**
  saves the BASIC program "prog" on the current drive
- **SAVE *"b:pic" SCREEN$:**
  saves the image "pic" on drive B:
- **LOAD *"prog":**
  loads the BASIC program "prog" from the current drive
- **LOAD *"c:data" CODE:**
  loads the CODE block "data" from drive C:
- **MOVE "b:":**
  changes the current drive to B:

Furthermore there are interesting commands like:

- **RUN *"bytes":**
  automatically executes the following 3 commands one after the other:
- **CLEAR startadr-1:**
  sets the RAMTOP in front of the CODE block to be loaded
- **LOAD *"bytes" CODE:**
  loads the CODE block
- **RANDOMIZE USR startadr:**
  starts the program at the start address

There are other commands for deleting and copying files, formatting floppy disks and reading a specific disk sector. I have not tried all of these and refer to the DivIDE Plus manual at this point.

A minor disadvantage of MDOS3 is that it must always be reactivated and initialized when the Spectrum is switched on. So after switching with OUT 23,6 it is mandatory to execute PRINT USR 0 and it is necessary to reinsert the required disks via NMI. However, this firmware makes a very professional impression and on the MD3 image in the already mentioned file "mdos3-images.zip" some interesting programs can be found.

OUT 23,72 (OUT 23,104): ResiDOS 2.25

ResiDOS is a very complex firmware for the DivIDE Plus and so the description of this firmware alone takes a good half of the DivIDE Plus manual. This firmware is the only one that runs completely in RAM and uses a special mode of the DivIDE Plus for this purpose (more about this later).

When the DivIDE Plus is shipped, ResiDOS is usually pre-installed. Unfortunately ResiDOS didn't work properly on my device, moreover there was a new version in the meantime and so it is recommended to reinstall ResiDOS completely. At this point there should be a download link, but the ResiDOS page at World of Spectrum can't be found anymore and also all other download options of ResiDOS seem to have disappeared. By the way, ResiDOS was created by Garry Lancaster, who is currently very active in the software development of the Spectrum Next. Probably for this reason all activities on ResiDOS were stopped.

For those interested, I have put the latest ResiDOS version 2.30 for the DivIDE Plus on my homepage **[https://s-huehn.de/spectrum/software.htm#residos].**

The installation is quite simple: After the download the ZIP archive is unpacked and the file "residos.tap" is copied to a CF card in FAT format. Via the Disk Browser of FATware the file "residos.tap" can be selected and started in BASIC. A security query is confirmed with ENTER and the installer first displays the recognized RAM size of 512kB. Another press on ENTER finally starts the installation. This takes a few seconds, then the Spectrum restarts with ResiDOS and displays some information about the system.

Once ResiDOS is installed, it will of course remain in memory even when the Spectrum is switched off, due to the battery buffering. Also all settings like the loaded modules or the current directory remain. If necessary, a re-initialization of the system can be triggered with the already known PRINT USR 0.

For starting ResiDOS there are 2 different OUT commands. OUT 23,104 should be used according to the manual always if one changes with programs or data in the memory to ResiDOS, in order to work on these with ResiDOS further. When using OUT 23,72 the RAM area where ResiDOS is installed is write protected. Why one makes a difference here is not quite clear to me. I basically only work with OUT 23,104 and have not noticed any side effects so far.

ResiDOS can directly access disks with FAT16 structure, furthermore it can also handle IDEDOS, which is used on the Spectrum +2A or +3 with the IDE extension +3e. The naming of the drives seems a bit unusual at first, so when the system is initialized with PRINT USR 0, a drive "0A:" is created. The letter "A:" represents the first drive, the number "0" corresponds to a user area, which is used with IDEDOS and may still be known to the older generation from CP/M. Furthermore ResiDOS can of course handle path names, where both slashes "/" and "\" can be used.

ResiDOS sets the first drive as the current drive and all commands without additional drive specifications always refer to this drive. For example, if a command is to be applied to drive B:, then simply "B:" is placed in front of the file name. ResiDOS extends the BASIC by many additional commands, which begin with a percent sign "%". Here are some examples:

- **%dir:**
  shows the content of the current directory
- **%cd "games":**
  changes to the subdirectory "games
- **%cd "..":**
  changes to the directory above it
- **%cd "/":**
  changes to the root directory
- **%md "pics":**
  creates the directory "pics
- **%rd "demos":**
  deletes the directory "demos" (must be empty)
- **%era "prog2":**
  deletes the file "prog2
- **%del "bytes":**
  deletes the file "bytes
- **%cp "dat1","/games/d":**
  copies the file "dat1" from the current directory to "/games/d".
- **%cp "/progs/lister","":**
  copies the file "lister" from "/progs" to the current directory
- **%ren "test1", "game1":**
  renames the file "test1" to "game1
- **SAVE %"prog1":**
  saves the program "prog1" in the current directory
- **LOAD %"prog2":**
  loads the program "prog2" from the current directory

Wildcards (* and ?) can also be used, e.g. to copy or delete several files. By the way, SAVE and LOAD accesses the FAT disk directly. Thereby all files are provided with an additional header, so that they can also be read by the +3e system.
Basically ResiDOS uses the 8.3 notation known from MS-DOS for the file names, so instead of "prog1" it is better to write "prog1.bas". This way the files can be better assigned and managed on the Spectrum as well as on a PC. The upper/lower case is not important here, on the disk upper case letters are always used and ResiDOS converts the characters accordingly. Unfortunately ResiDOS does not support long file names, but access to such files is still possible via the corresponding short name (e.g. "progra~1.tap").
Of course ResiDOS can also load snapshot files (SNA and Z80), there is a special command for this:

%snapload "demo1.sna": loads and starts the program "demo1.sna".

ResiDOS can do much more, but that would go beyond the scope of this article. However, I would like to go into one functionality: ResiDOS can be extended with additional modules and the following modules are currently available:

- **Channels**
  allows writing and reading of data fields and comfortable use of screen windows
- **TapeIO**
  used for reading and writing TAP and TZX files
- **TaskMan**
  activates a task manager via an NMI menu, allows switching between several Spectrum programs and creating snapshots
- **ZX80 Emulator**
  allows running .O files (only on Spectrum 128k)
- **ZX81 Emulator**
  allows to run .P files (only on Spectrum 128k)

Such a module (called package) is always installed according to the same principle, as an example I choose TapeIO here. First you have to get the desired package (is included in the ResiDOS package on my homepage) and copy it to a CF card. After switching on the Spectrum and switching to ResiDOS with OUT 23,104 you change e.g. with %cd "/system" into the directory where the file "tapeio.pkg" is stored. Continue with the following commands:

- **CLEAR 32767:**
  set RAMTOP
- **%install "tapeio.pkg":**
  Install package

After that you can immediately work with the new module and load e.g. a TAP file:

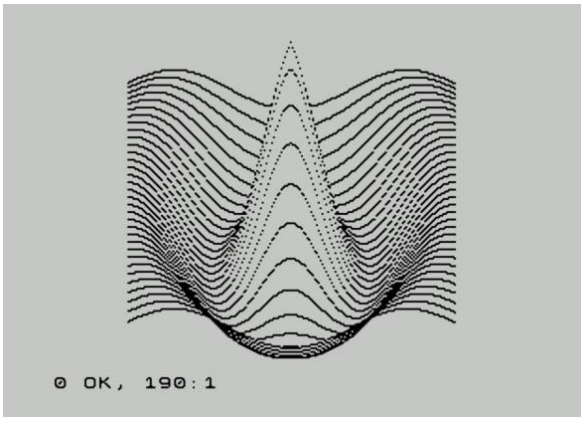
- **%tapein "/games/j/jumping.tap":**
  insert the TAP file "jumping.tap" as virtual tape for reading
- **LOAD "":**
  load from virtual tape

TapeIO can also write virtual tapes, you can list the contents of a tape, jump to arbitrary positions and more. For more information about TapeIO and generally about ResiDOS I refer to the DivIDE Plus manual. There you can find the complete command reference and the description of further possibilities.

To be continued...

(sfk)

BASIC GIMMICK




```
  5 REM Sombrero by Mike Lord 1982
100 FOR x=40 TO 215
110 LET b=999: LET t=0
120 FOR y=16 TO 144 STEP 4
130 LET r=SQR ((x-127)*(x-127)+
    (y-80)*(y-80))/15
140 LET z=INT (y+90*EXP (-r/3)*COS r)
150 IF z<b OR z>t THEN PLOT x,z
160 IF z<b THEN LET b=z
170 IF z>t THEN LET t=z
180 NEXT y
190 NEXT x
```

On the Spectrum the calculation of the graphics runs for a long time. It is worthwhile to run the program in an emulator and to increase the processing speed.
By changing the divider factors in lines 130 (15) and 140 (3) the appearance of the graphic can be changed. It may be necessary to reduce the step length in line 120 in order to produce a correspondingly continuous graphic.

NEARLY A ZX81 CLONE - THE »LAMBDA 8300«

BY JOACHIM GEUPEL

The **Lambda 8300** was a *ZX81 clone* made by *Lambda Electronics Limited* from Hong Kong in 1983. Information about *Lambda Electronics Limited* is almost impossible to find. There are so many companies with the name »*Lambda*« in the company name that it seems impossible to find out who or what *Lambda Electronics Limited* is or in which corporation this company was absorbed. The only thing I actually found was a phone built by *Lambda Electronics Limited* that is or was being peddled on *Ebay Canada*.

The **Lambda 8300** is not an exact *ZX81* clone, as it has a modified *ZX81 ROM*. However, it can be equipped with a *ZX81* compatible *ROM* so that it can be used as a *ZX81*. The main differences from the *ZX81* are that the BASIC is incompatible with the *ZX81*, and every command must be written out, no Keywords are supported. It has an additional graphic mode of 54 columns and 48 rows in the form of block graphic characters. There is also a built-in speaker and sound support for this.

The phone from Lambda Electronics Limited

Originally the **Lambda** was released with 2K RAM. In Germany it appeared under the name **Power 3000**. 16KB memory expansion was included, because the programs, which were on the market for the *ZX81*, already required a larger memory. For this reason, the Lambda was donated the 16kB module, which allowed it to load the *ZX81* programs.

As mentioned above, the **Lambda 8300** has a speaker, a BAS monitor output and a joystick port, unlike the *ZX81*. The Z80A microprocessor is clocked with 3.25 MHz and should be quite fast. But it isn't. The operating speed is just as lame as that of the *ZX81*. This is somewhat surprising, however, since the **Lambda** has a fixed screen memory area that does not have to be reallocated after each input as on the *ZX81*.

The **Lambda PC8300** was spread in many countries, but this was due to the fact that it was copied under license by quite a few companies. The circuit board always carries the inscription **"PC8300".** Many companies copied the **Lambda 8300** under license. In the Scandinavian countries the computer was called **Basic 2000**, in the USA **Futura 8300**. It was also identical with the computers **DEF 3000**, **PC 2000**, **Marathon 32K**, **IQ 8300**, **PC** 8300, **Unisonic 8300** and **Basic 3000**. Unisonic distributed it as **Futura 8300** in the USA. The computer was reasonably successful in Europe, especially in the Eastern European countries.

One of the most important differences to the *ZX81* is that the **Lambda 8300** has a BAS output. However, the picture is not very good. A small addition can improve the picture by placing a 75 ohm resistor in series with the monitor output. This will eliminate much of the noise and the picture will be somewhat better. The *Lambda* Keyboard was better than the *ZX81* Keyboard. It is much easier to use than the *ZX81*. Which is not to say that it comes close to that of the *ZX Spectrum NEXT*, far from it! But it is better than the one of the *ZX81*.

The Basic commands have to be entered directly, character by character, similar to the *ZXS 128* computers. Only a few commands are tokenized. They are tokenized after input at the completion of the command line and also edited as such. In this again the Lambda differs e.g. from *ZXS128*-Basic.

The **Lambda 8300** is equipped with colour commands similar to those of the ZX Spectrum. To display colours, a colour module is required. The schematic for this can be found on ***www.8Bit-Wiki.de*** .

The sound commands are more versatile than on the *ZX Spectrum 48*, which only understands *BEEP length,pitch*. Tones can be entered according to the scale and played at different speeds.
Each key of the **Lambda 8300** is underlaid with a different tone. This can be quite annoying at times. Apparently the developer of the ROM noticed this too, because they added a command to the Basic that turns off the key tone. With *NOBEEP* the sound is switched off and with *BEEP* it is switched on again.
The command set is all in all compatible to the *ZX81*. So programs can be loaded directly from the *ZX81*, which should then run. I didn't test this, so I don't know if this is really the case. The programs of the Lambda cannot be loaded into the *ZX81*, because they are not compatible. The memory allocations of the computers differ, so that the *ZX81* already gets lost when loading the program.
My conclusion is that the **Lambda 8300** is a nice device in a sturdy case. It has some weaknesses that the *ZX81* does not have. For example, even the *ZX81's* screen output over the modulator is better displayed than the Lambda's BAS output. On the other Hand Sound and Color Ability are Advantages compared to the *ZX81*. The Lambda is a real collector's item, so it fits right into my collection.
(jg)

THE TRAPDOOR!

BY DIETER HUCKE

Today I would like to introduce you to one of my favourite games, ***THE TRAPDOOR!***
It was released in 1986 on Piranha Games, and was also released for the Amstrad CPC and Commodore 64.
It was written by Don Priestley and is based on the British children's television show of the same name. The music was composed by David Dunn.
Here's the first episode from British television:

https://www.youtube.com/watch?v=1feYxwwn0eM

The Movie: Trapdoor

ABOUT THE STORY:

Berk, a good-natured blue male (don't know better to describe as a 3D-plastic-Animation, please look at the TV series) lives as a servant in a castle, where he has to fulfil the culinary desires of his master. This is a bad-tempered beast that is never seen, but again and again it roars its desires through the rooms. With the help of his friends, ingenious ideas and diligence, Berk must manage to keep his master happy. Well, *Drutt* (a mischievous spider) is really no help. The yellow frog or Spider is constantly hunting for the worms that Berk is supposed to catch. Boni on the other hand, gives good clues when taken off the podium.
In the basement live green *slimies*, which are not easy to catch. But they seem to be delicious, because later they end up on the menu of *Berk's* master. In another room there are three pots on the floor, the meaning of which you will surely immediately sense. In another room is a thick weight on a chain, next to it a switch. Act on it and see what happens. Just to say that something has to be broken!
Then there is a small freight elevator. Berk can put things in here, then wade up and press the switch. He himself is not allowed to enter the premises of his master, he must send up objects by elevator.
There are four tasks waiting for Berk, which can be done either as »Learner Berk« or »Super Berk«:
A jug of worms that are simply sent up the elevator in a mug.
Fried egg, heated by freshly laid eggs in a pan.
Eye juice obtained from the flowers of a plant and a fruit press.
Freshly cooked *slimies* steamed in a large cooking pot.
Sounds delicious, doesn't it? But Berk has to do really well to get everything done on time, because time is running out and the bad mood of the "beast" is rising. If Berk doesn't make it until time is up, his points will fall and the score at the end will get worse.
In Superberk mode, every task must be completed, in Learner mode the task can be skipped.

Important: For emulators there is a TAP from Trapdoor with an error, with this version, Trapdoor cannot be played to the end. To check this, at the beginning take the skull Boni out of its frame, and put it back again. If it is then only half-way up, the TAP is defective. The pan cannot be heated later on the stove, so the TAP is unusable.
An intact TAP/TZX can be loaded under the link https://www.worldofspectrum.org//pub/sinclair/games/t/TrapDoorThe.tzx.zip.

Now to the four tasks:

1. A Can of Worms:

Trapdoor Worms

This is a simple task, Berk has to collect four worms in a cup and then send them up with the elevator. If only there wasn't this yellow frog Drutt, who constantly wants to catch the worms before Berk gets hold of them. With a little skill, the trapdoor can help solve this problem!
A hint: when the four worms in the elevator are ready to send up, dispense with the bonus points and prepare the next tasks instead, because time is a little short for the following tasks.

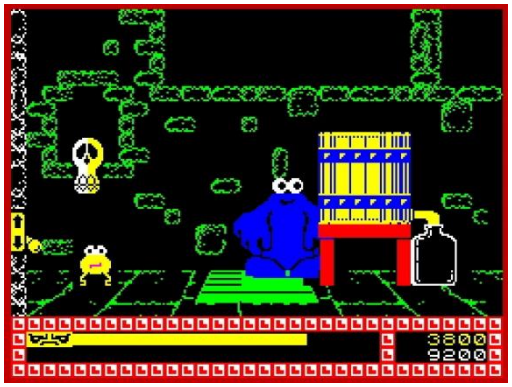
2. Berk, I want fried Eggs!

Trapdoor Chicken

This task is somewhat mean, animal rights activists could get upset. I don't want to reveal too much, just so much, in one of the containers in the kitchen is a white utensil that you should put on the trap door after the chicken flutters around. The Trapdoor is used as a catapult, and timing with the chicken is everything! Berk also needs the flat pan, which is then heated on the stove.

Anyone who uses an emulator or multiface should save after each successful egg,
because if one of the eggs does not end up in the pan, this cannot be made up, the chicken only lays three eggs.

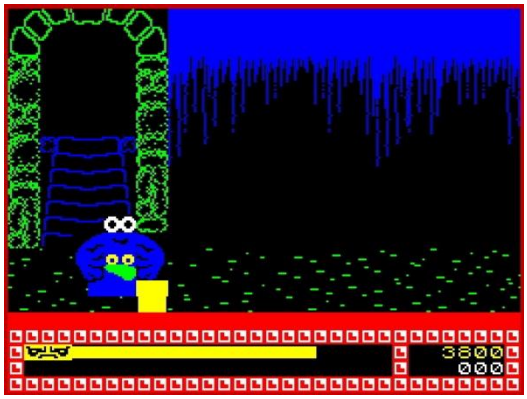
3. I want a bottle of Eyeball Crush!



Trapdoor Crush

Sounds worse than it is. Berk can fetch a blue box of seeds "seed" from the kitchen, it is hidden in a container. These three seeds are planted in three pots, and ... yes, stop for a moment and let yourself be surprised! After a while there are three eyes at the bottom, which must be collected and thrown into the fruit press. Now it's getting very tricky. It is best to push the fruit press into the room with the oven. Do not forget the glass, and then a suitable helper must be released from the trap door. I will not tell you who this "helper" is, but you will recognize it immediately.
When the glass is full with Eyeball Crush, send it up with the elevator.

4. I want boiled Slimies.



Trapdoor Slimies

The green slimies must be collected from the basement, they are not heated in the pan, but in the large red pot. After tipping the slimies into the pot from above, it is best to position the pot directly at the elevator. Since the pot does not fit on

the stove, one of the monsters has to be used for it. Just two tips: Take advantage of the short pause before the monster spews fire. And: it can not be returned to the trap door, but must be "eliminated" with a special task.

In Superberk mode you have to clean up by throwing everything into the open trap door after fulfilling all tasks, only the skull can stay on top. Then you send the elevator up empty one last time and get your reward.

Dieter Hucke, January 2021

THE »ZX DIAG CARD«

BY JOACHIM GEUPEL

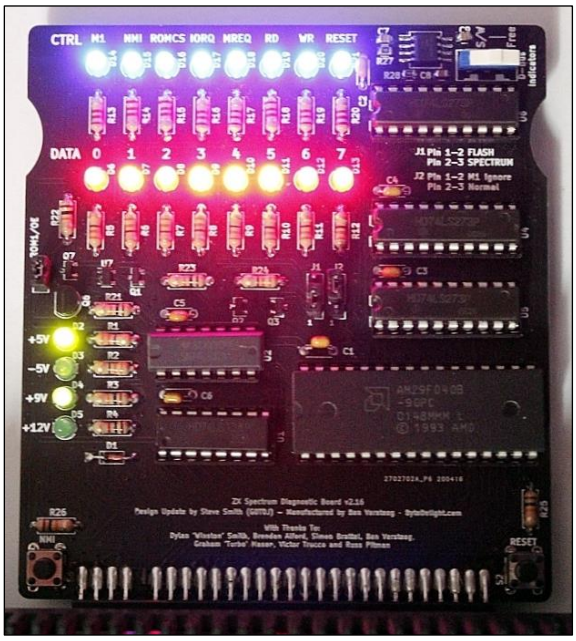
The ZX DIAG Card creates a fault diagnosis of the ZX Spectrum computers with the help of software integrated on the board. It examines the Spectrum for basic errors and displays them within its capabilities. The card automatically detects what Spectrum is connected. All Spectrum computers are recognised, i.e. from ZXS 16 to ZXS+3. Any errors displayed then also refer to the original ZX Spectrum. Clone computers and replicas such as Harlequin or Didaktic can also be examined, but they must have a compatible Edge connector and in the event of an error, the components displayed are logically not identical to those installed in the originals. It is important to know that if the Spectrum has died to the point where nothing is displayed, the card cannot work either. The Diag Card depends on a working Spectrum hardware at least to the extent that it needs the screen output and a halfway working processor.

How does the Diag Board work?

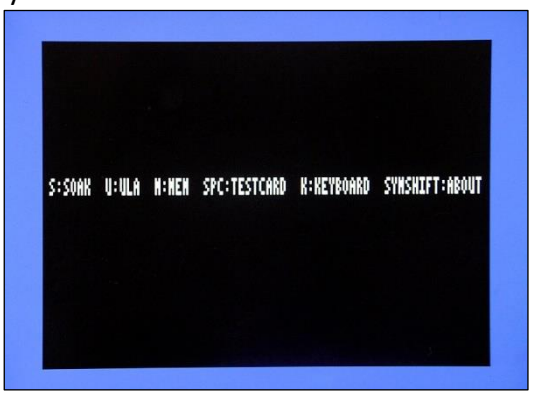
On the Diag Board there is a Flash ROM that is connected to the Spectrum via its own decoding. When the board is plugged onto the Edge Connector, the internal ROM is set to inactive via +5V at the /ROMCS, and the Flash ROM of the Diag Card is active instead. Since this also eliminates the address decoding of the Spectrum ROM, the Diag Card needs an own address decoding. Many thanks to tofro and ZX-Heinz from the Tlienhard-Forum who helped me a bit on this.

The Diag Card examines the following functions and components:

ROM, Lower Ram, Upper Ram, the switching to the second 64kB of the 128k models and the interrupts, the ULA or the ULA functions of the 128kB Spectrum.



On the card, which is actually not an interface but an extension of the "ZX Spectrum" system with the function of error diagnosis, there are three rows of LEDs that provide information about the respective status. The upper row of eight blue LEDs indicates the status of the control lines. According to the manual, the corresponding handshake signals exchanged between the processor and its peripherals can be observed by means of a tricky timer circuit. If there were no timing circuit, the LEDs would flash so fast that there would be no visible difference between "on" and "off". The second row, also eight LEDs, this time red, indicate, depending on the position of the slide switch, either the status of the data bus or, after switching on, a countdown is counted down until all LEDs are off and the diagnostic tool is started. A third row of four green LEDs indicates the status of the power supply.



The Start Screen

Of course, the board can also be configured to a certain extent. With the already mentioned slide switch to the right of the blue LEDs, you can switch between the
status display of the data bus and the countdown. To what extent this is useful remains to be seen, since at least the ZX 48 emits a beep sound while one LED after the other goes out.

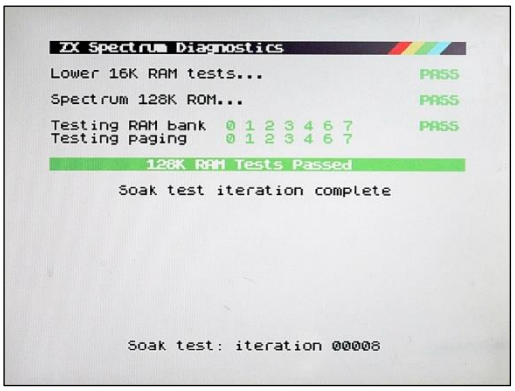
Jumper 1 selects the boot sequence. If it is plugged into pin 1-2, the diagnostic tool starts, in position 2-3 the Spectrum boots normally.

Jumper J2 selects the processor signal M1 or ignores it. This control signal, which comes from the CPU, is used to mark the "command retrievee cycles". M1 indicates that an instruction is being fetched from memory. Together w2ith the IORQ, an interrupt is also acknowledged. With the ZX16/48 and Toastrack, M1 is simply connected to the edge connector, and at least with the +2A/b and +3, M1 is connected to two diodes, the purpose of this is not clear to me... There, M1 is also not connected to the edge connector.

Jumper ROM/OE is used for compatibility with the Brazilian replicas. There, the ROM/OE line is used for sound output, at least according to the description.

Five different tests can be performed with the Diag Card. These tests are performed when the corresponding button is pressed within the countdown, as "S" for SOAK test, "U" for ULA test, and so on. From right to left, as shown on the Diag Card home screen, the tests are as follows:

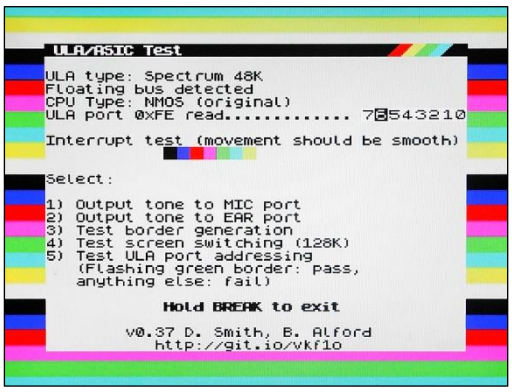
THE »SOAK TEST«



The SOAK test

The SOAK test is effectively the acid test of the Ram. The ULA is tested first, followed by the RAM test. Here, all RAM tests are carried out that are also carried out in the test programme when the Diag Cart starts normally. This test runs in an endless loop until the Spectrum is switched off or the Reset button is pressed. »Weak Rams« can be found here.

The »ULA test«



The ULA test

Here, quite surprisingly, the ULA functions are tested.

The ULA type is automatically detected and displayed at the top of the screen. The bus is detected and the CPU type is displayed. These tests are basic tests. Generally, a NMOS CPU type is displayed. A CMOS type may cause incompatibilities and the CPU may need to be replaced. The ULA port display is a little more complex. Bits 0-4 are affected by the keyboard. The keyboard query can be carried out here. However, there is a separate test function for this. Bit 6 is always set; if bits 5 and 7 are set, this may indicate an error in the ULA addressing.

Below the ULA port read test, an eight-coloured strip wanders back and forth. It shows whether the interupts are working and their frequency is correct. If an error occurs, the message "FAIL FAIL FAIL" is displayed in the middle of the line. When pressing 1 - 5, this strip stops because the interupts are switched off.

When pressing key 1, a tone is send via the MIC connector of the ULA, accompanied by red-cyan stripes in the border area. This can be used to check the output of the tape storage.

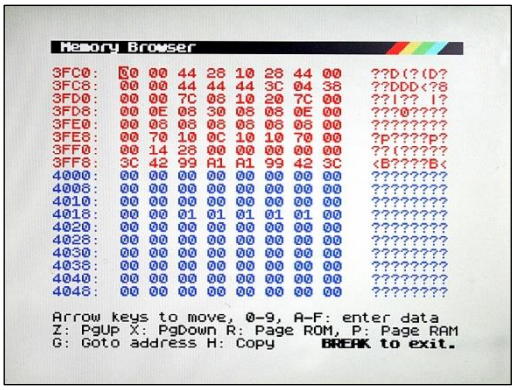
Pressing button 2 will also output a tone, this time from the EAR connector on the ULA. On a ZXS16/18 the sound can be heard, the others are known not to have a built-in speaker. Blue-yellow stripes are output in the border area at the same time.

Button 3 tests the generation of the border colours as a rainbow pattern.

Key 4 is again a complex test. On 128k computers, the shadow screen is tested by overlaying the screen with green bars on the screen and on the border. A problem switching the screen would cause the whole screen to turn green or only stripes to be seen at the edge, as is somewhat the case with the ZXS 48.

When pressing key 5, the ULA addressing is checked. Values are written alternately to ULA port 254 and port 255. If everything is OK, you will see a flashing green/white border. However, if the ULA responds to OUTs that are not intended for it, a flashing red/white border or some other indeterminate state is seen, depending on the particular error.

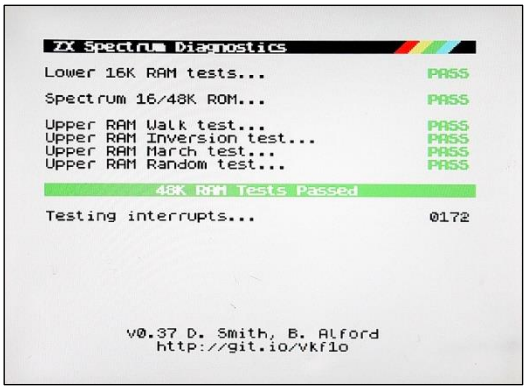
The Memory-Browser



The Memory Browser

For those who always want to know exactly what is going on in the memory, the Diag Card has a Memory Browser. Here, a deeper look into the memory can be taken and changed if necessary. The addresses are in HEX, those adresses that can be written to are blue, all others are red. Try it out, it is quite interesting to see what is going on in the memory.

The complete test



The complete test

With the space bar or after the countdown has expired, the programme jumps to the test routine in which all tests are carried out. Immediately after the start, the ULA is tested, followed by the Lower RAM, then the Upper RAM. The same test is carried out here that can also be called up with *»S«,* except that the individual steps are displayed here. In the *»Walk Test«,* each bit in the memory is set and resetted. The result is checked. The *»Inversion Test«* has nothing to do with *»Space Invaders«* but checks whether another bit is also

set when setting and resetting a bit, which it is actually not allowed to do.

The *»March test«* aims to eliminate simple errors caused by addressing a memory location, which in turn causes neighbouring memory locations to be written incorrectly. The algorithm works as follows:

1. Write a 0 in ascending addressing order.
2. Read the 0 and write 255 again in ascending addressing order.
3. Read the 255 and write 0 in descending order of addressing.
4. Read the 0 in descending order of addressing.

In the »Random test«, 16-bit random numbers are written into the memory and then checked to see if these random numbers appear in any other place in the memory. To do this, first the entire memory is filled, then the random number generator is reset and restarted. Since there are no real random numbers in the computer, the generator is used to generate the same numbers again and compare them with the memory contents.

Once the memory test is complete, the interrupts are checked and indicated by an incrementing counter.

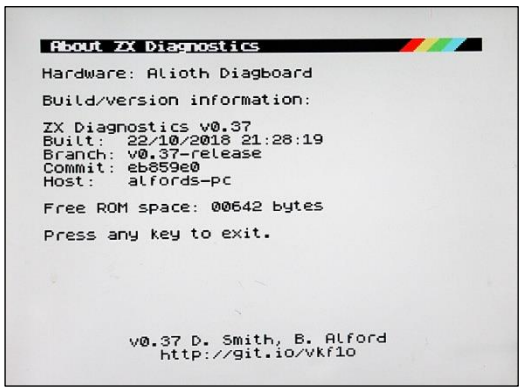
The final *»ROM Paging Test«* cannot get access to the ZX Spectrum ROM while the Flash ROM is paged in. So the Flash ROM is copied into the ZX Spectrum RAM, and then the ZX Spectrum ROM pages in, which is tested afterwards. A counter is counted down and at 0 the Spectrum returns to its system.

The complete test

The keyboard test

What is hidden behind *»K«* is self-explanatory. Here, all keys are queried on the basis of the keyboard layout of the ZXS 48. As the picture shows, the untested keys are shown in black on a blue background. If a key is pressed, the colour changes to white on a blue background.

Copyright



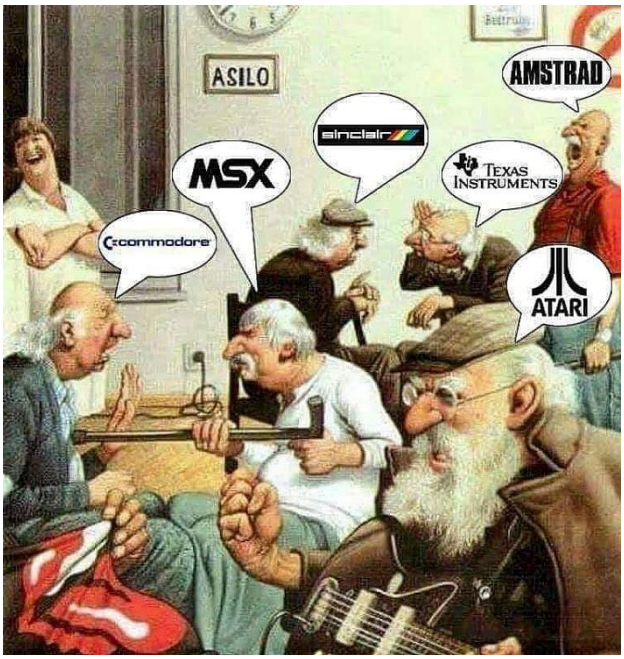
What the hell did I plug in there anyway?!

And last but not least, you can use *»Symbol Shift«* to display the message of what you actually put on your Speccy and who designed and programmed the *Diag Board*.

I have tested all my ZX Spectrum, starting with the *ZXS 48* up to the *+3*, including *Harlequin 48* and *128*, with it. On the *+2*, saving and loading programs no longer works, as there is a permanent output signal that overwrites everything else, and on one of the *ZXS 48s*, a RAM in the upper ram area was defective. All the others are ok.

In conclusion, I can say that the *Diag Card* perfectly supports troubleshooting in the ZX Spectrum computers, even if not everything is found. But that is not the claim. The claim is the error diagnosis in the Spectrum computers, and this claim is fulfilled perfectly. I would also like to point out that the Diag Card should not be connected to the Next. It can work, but it can also send the Next to computer heaven.

(jg)



Philosophic discussion...

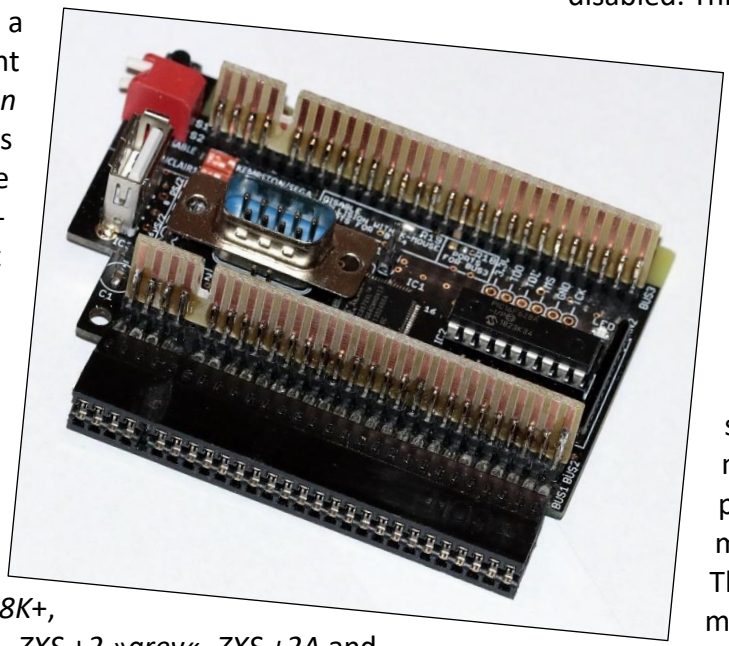
MOUSE INTERFACE FOR THE ZX SPECTRUM

BY JOACHIM GEUPEL

The original mouse interface from Kempston

The original Kempston mouse interface was introduced by *Kempston Electronics* in 1984. At that time I didn't even know that such an interface for the Spectrum existed at all. It was compatible with the ZX Spectrum computer up to the *ZX Spectrum +2 Grey*. The mouse had two buttons and used an optical system to decode the movements of an internal tracker ball. Mouse movements were monitored by the interface itself, and a simple port read provided X and Y coordinates at all times. The disadvantage of the interface was that the common mice from *Atari*, *Amiga*, or the serial mice for the PC were or are not compatible.

The *K-Mouse Turbo 2017 LP* interface is a replica and at the same time a further development of the *Kempston mouse interface*. It has a *PS/2* compatible USB port and a configurable joystick port that supports both the *Atari/Amiga* joystick and Sega's Gen-Genesis gamepad. The interface is fully compatible with all *Sinclair ZX Spectrum* models, which are: *ZXS 16K*, *ZXS 48K* & *48K+*, *ZXS 128K* »*Toastrack*«, *ZXS +2* »*grey*«, *ZXS +2A* and *+2*, which are identical in construction anyway, and *ZSX +3*. In addition, at least the *Harlequin 48* can be used. The *Harlequin 128*, at least my device, does not agree with the interface and refuses access.



Unlike the original interface, the PS/2 protocol is supported. The mouse is connected via a USB port. A PS/2 port is not available, so the mouse has to be connected via a corresponding adapter.

The K-Mouse interface is available in two versions, which are exactly the same in function. In both versions, the edge connector is looped through to the back.

The *K-Mouse Turbo 2017-LP *XL** version still has two slots where additional interfaces can be plugged in. The *K-Mouse Turbo 2017-LP* version does not have these slots. They can be retrofitted if double-sided connector boards with double-sided strip grid are available.

Two miniature switches can be used to configure the interface. The switches can be used to configure the joystick connection. A total of four modes are possible:

- Kempston/Gamepad,
- Sinclair joystick
- A quasi keyboard mode,
- Disabling the joystick port

It can be customized with two jumpers.

Since the *ZXS +2A* and *+3* already have two joystick ports, the *K-Mouse Turbo's* access must be disabled. This is done with *jumper 1*.

Jumper 2 activates or deactivates the vectors that are output to the data bus in order to be able to connect "old" mouse interfaces.

The original *jumper J3* is not equipped anymore. With it the interface could be switched to master and slave. According to the manual, this is no longer possible, but it is documented.

The speed of the mouse movement can be slowed down if the mouse has three buttons. To reduce the speed, the three mouse buttons have to be pressed and released at the same time. After a subsequent press on the middle button, the speed is reduced. To get back into 'fast mode', the process is simply repeated.

Both the joystick and the mouse can be queried relatively easily using the Spectrum-Basic's respective IN commands.

With *IN 31* the joystick is queried. The eight positions of the joystick and the fire button are returned. The following mini-program reads the joystick. Everything else is further programming.

```
10 LET a= IN 31
20 PRINT AT 5,5;"(three spaces)";
   AT 5,5;a
30 GO TO 10
```

Querying and evaluating the mouse position and the keystrokes is a bit more difficult.
In MASTER mode three ports are used. The fourth port detects the connected interface.

- **Port 64479:**
  8-bit value of the absolute position of the X-axis
- **Port 65503:**
  8-bit value of the absolute position of the Y-axis
- **Port 64223:**
  the three keys and the position of the mouse wheel
- **Port 65247:**
  Detection of the K-Mouse Turbo - Interface. Always returns the value 128

The following program reads the value of the three ports and puts a dot on the screen. When the middle button is pressed, a small circle is drawn at the current plot position. It should be noted that the mouse wheel must first be turned until the final value is reached. Each press of the mouse wheel changes the value. The final values of the screen positions are not evaluated, so as soon as x/y values correspond to the screen edges and the middle key is pressed, the program is terminated with an error message.

```
10 LET x = IN 64479
20 LET y = IN 65503
30 LET z = IN 64223
40 INPUT "": PRINT#1; "x: ";x; "y:
   ";y; "z: ";z
50 IF z <> 255 THEN CIRCLE x,y,2
60 PLOT x,y
70 GO TO 10
```

The program also works in the Spectrum emulator *»basinC«* as well as in *»EmuZWin«*.
(jg)

"CRASH MICRO" - DEC 2020 ISSUE

BY THOMAS EBERLE

In the last issue I already described that CRASH is now published quarterly. This information is already outdated, as the magazine is now published 2-monthly. Apparently there is so much to write about and so many interested subscribers and the boom is still going on.

In the style of the earlier Crash, but also of the annuals in the last years, you get first greeted with an editorial and news from all over the world (no coincidence that it is similar in SUCSession). Fixed sections are, as always, the Reader's Letter Forum, Playing Tips, Adventure Trail and, of course, lots of game reviews. I'm reviewing the first issue from December 2020, where nine games were reviewed plus four adventure games in the Adventure section. In addition, there are background reports, previews of upcoming game hits and a fairly large report on the Spectrum Next (hardware and software).
All in all, this Crash issue offers 60 pages of reading fun. The only downer is that it's only an A5 magazine. While printed in high quality, I would have liked to see the magazine in A4. The font size is the same as in an A4 magazine, so we don't have to strain our aging eyes, but I still prefer to hold an A4 magazine in my hand. Although it would then be perhaps only 30 instead of 60 pages, but that would not be an obstacle for me. Why the booklet has to be A5, we will still find out, it could have postal reasons.

It is nice that there are still some members from the good old Crash Sinclair times on board and writing for the Crash. The quality of the articles is much higher than many fanzines, well researched and written in the same style the Crash has always been. I'm curious to see how the bimonthly issue will continue.
The magazine is available as subscription only, subscriptions can be cancelled at any time. Those who want to subscribe create a membership on Patreon to support it. Membership costs €6.50 (+ VAT) for readers outside the UK and is billed with each issue unless you cancel your membership beforehand. As far as I know the VAT rules have become a bit more difficult, so far books in the UK were exempt from VAT, now you have to charge to the country you are shipping to. By the way, this also applies if you only want to receive a PDF edition for 2.50 Euros. Membership can be taken out at:
https://www.patreon.com/crashmagazine
There is no other way to get the magazine. By the way, members also received a digital edition of the first issue, i.e. a format that could be scrolled on the screen and links could be executed by clicking. In addition, the pictures of the games are then partly animated, so you can imagine the games even better than purely with the description and static images. It's possible that this will be a new format for the future, but at the moment I'm quite happy to still get printed editions, actually I also like to read sometimes not on the screen.

HOW DO I GET A GAME ON DISK?

BY THOMAS EBERLE

Always when I get the chance, I try to encourage you to get active yourself. Of course, many have emulators nowadays, but I'm still in favor of playing programs on the real Spectrum, and many of you have one of the great floppy systems. But the programs on the Internet are in TAP format (or TRD etc.).
Elsewhere I introduced Total Commander to you, to bring the single files then e.g. on MB02, but of course you can also save on MSDOS floppy disk (if floppy drive is available on the PC) and for Opus as well as for +D there is software which again reads 720k MSDOS. In case of need there is always the simple transfer via a cassette recorder, i.e. the emulator saves via sound card to cassette, and in Spectrum you load it again from the recorder.
Anyway, there are many methods to transfer the files, with my MB02 I'm probably quite well equipped here. But here I want to describe what follows. As for an example I am using the program "Zxombies", which is on the new SCENE+ disk.
The files look like this:

- Zxombies Basic
- Loader - MCode
- Screen - Spectrum Image
- 128k - MCode
- app.bin - MCode

When I looked at this, I already suspected that it is not just about rewriting the Basic. In fact the Basic looks like this:

```
10 PAPER 0: INK 0: BORDER 0:
   CLEAR 24015: POKE 23739,111:
   LOAD „" CODE 24016:
   RANDOMIZE USR 24016
```

So first the screen is made black, RAMTOP is set and then a POKE which causes that the usual message when loading cartridge (bytes: ...) is not displayed. Then the loader is loaded and started. The remaining program parts are then loaded by a machine code routine in the loader. So I have to have a look at this machine code program. This can be done on the Spectrum, for example with the MB02 and "DEVASTACE", a disassembler that sits in the screen memory. More comfortable is to use an emulator, here I recommend SPIN, which is free and includes a disassembler.
I have commented the listing.
(The comments are valid for the line above. [jg])

```
DI
    Turns off the interrupt
LD SP,24015
    The stack pointer is set to
    24015, the reason
    is not clear to me
LD BC,32765
PUSH BC
LD IX,16384
    Here begins the load routine for
    the image
LD DE, 17
LD A, 255
SCF
CALL 1366
LD IX, 16384
LD DE, 6912
LD A, 255
SCF
CALL 1366
LD A, 20
    Here we refer to the rambank
    for the second screen
```

```
    memory
POP BC
PUSH BC
OUT (C), A
LD (23388), A
LD BC, 6912
    The image is saved in the
    second screen memory
    of the 128k
LD HL, 16384
LD DE, 49152
LDIR
LD A, 17
    Switching the 128k ram bank
POP BC
PUSH BC
OUT (C), A
LD (23388), A
LD IX, 49152
    Loading routine for the 128k rou-
tines
LD DE, 17
LD A, 255
SCF
CALL 1366
LD IX, 49152
LD DE, 12288
LD A, 255
SCF
CALL 1366
POP BC
LD A, 16
    Switch from 128k ram bank to main
memory again
OUT (C), A
LD IX, 24144
    Loading routine for the last code
part
LD DE, 17
LD A, 255
SCF
CALL 1366
LD IX, 24144
LD DE, 41416
LD A, 255
SCF
CALL 1366
JP 24144  Jump to program start
```

I have also looked at the game itself. Saving the screen to the second screen does not make sense to me, it has no use in the game. The game is designed to run on 48k, the 128k parts are loaded but overwritten by the last MC part. Due to the short load times from disk, it wasn't worth it to me to remove it for the 48k users, although I didn't see anywhere in the game where 128 capabilities are used. I decided to just leave out the MC loader and write my own BasicLoader. This one I optimized a bit more memory-wise, just because that's how I always do it.

Here is the Basic:

```
10 BORDER NOT PI: PAPER NOT PI:
   INK NOT PI: CLEAR VAL "24143"
20 LOAD "zxom$" CODE:
   RANDOMIZE USR VAL "5e4"
30 POKE VAL "23388", VAL "17":
   OUT VAL "32765", VAL "17":
   LOAD "zxom128" CODE:
   RANDOMIZE USR VAL „49152"
40 POKE VAL "23388", VAL "16":
   OUT VAL "32765", VAL "17":
   LOAD "zxom.cd" CODE:
   RANDOMIZE USR VAL "24144"
```

I put the image through the Screen Compressor. Thereby it had instead of 6912 only 4179 bytes. Therefore after the loading still another USR Command takes place. Also I packed the 128kCodepart with *»Turbo Imploder«*, from 12288 Bytes became so 4562Bytes. The last code part is the longest with 41392 bytes. The *»Turbo Imploder«* brought a Pack Error. I tried »PKHUFF« which worked, but only packed to 36k and the unpack routine in screen memory destroyed the loading image. I then used the »Pklit« , which brought the whole thing down to a whopping 29321 bytes and did not unpack in screen memory.

In the end you have to add the appropriate disk load commands to the Basic, depending on *Opus*, *+D*, *Beta Disk*, *D80*... Since the program uses almost the entire Spectrum - memory, it becomes narrow for the Opus, but by use of the tool »Noram«, which is on many *SCENE+* diskettes, should also be solved this problem.

So it looked harder than it was, in principle I only wrote a new Basic Loader. Sometimes the first guess can be just wrong. I hope this gives others courage to convert programs. It is fun when you succeed and you can load the games from disk.

If you have converted an interesting program, we would like to have it on the *SCENE+* disk. In that case write me:

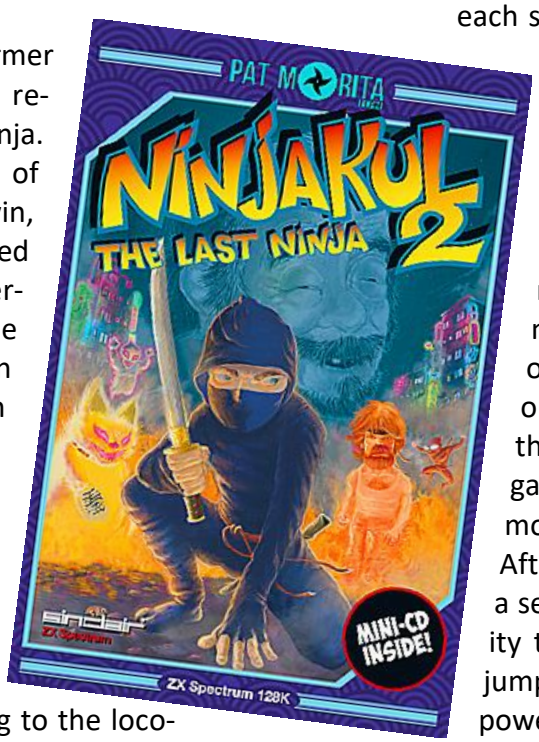
thomas.eberle@sintechshop.de

There is life on Mars !

COMMERCIAL GAME:
NINJAKUL 2: THE LAST NINJA

BY ELLVIS

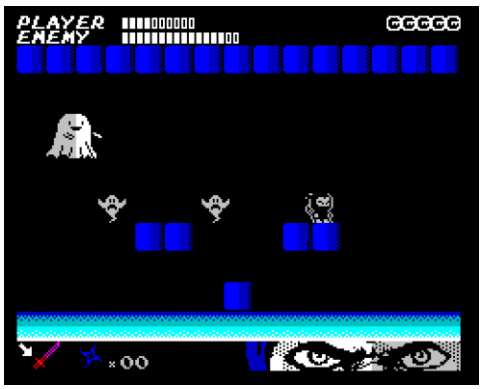
Mafia people are never your friends, especially when they kill your brother. As a last ninja you just have to go and get 'em all.



Ninjakul2 is a modern platformer inspired by the story of never released (on the Speccy) Last Ninja. You're fighting against a boss of Gunshi Clan and to be able to win, you have to collect 4 sacred scrolls that will improve 4 different aspects of your abilities. The game take place in HongKong in the 80's. We have to go through four parts of the city to get all the sacred scrolls and to fight four big bosses. That will unlock a way to the residence of Paco Romita, who is the actuall head of Gunshi Clan.

The game start on a train. We walk over the train cars heading to the locomotive and defeating enemies. If we fail, we die. At one point we can go inside of a train car where we see a bomb. I won't tell you what to do next, it is part of a prelude so we get into the story of the game.

After the train part we get a map with four places to go (marked A,B,C,D) and with fifth (?) as unreachable. We can choose which one to go to first, after each level we will always get back to the map. I can tell you that some part will have to be visited more than once. For now, let's start with the park, marked as A.



Zone B: »Happy Valley«

Here we have to walk through the park, fighting the enemies and collect the sacred scroll (well, it look a bit like a toilet paper) at one point. This level is great to train the controlls as we can plan each screen and a good thing is that killed enemies will not show up again when we leave the screen and then come back. As a weapon, we have our mighty sword, but at one point we will find also shurikens. These are important not only to kill enemies, but at one point we will have to use one to activate a switch. And this is another aspect of the game, there are few adventurous moments we have to solve.

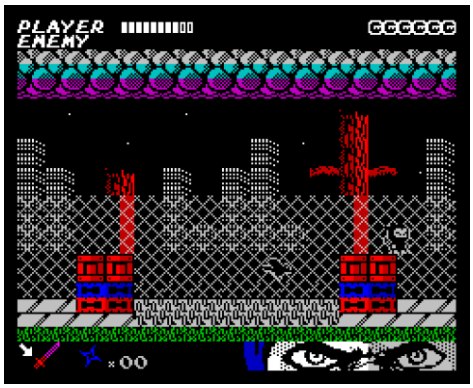
After we collect a scroll and finish a section, we can choose one ability to improve. Those are: double jump, speed, eyesight and sword power. We will need all of those to finish the game. Most obvious is probably the double jump, there is one platform unreachable in the first zone and also zone C allows us to visit only first two screens.

So, as said before, there are four zones to go through. The park is straightforward, we go as much right as we can, then we have to activate a ladder somehow, going up and back left, climbing up the trees and going right to jump over a building and continue to the end of the park. Zone B is called Happy Valley, but it is a kind of cementery in reall. Here we have to climb up the tower to get first big boss fight. Zone C are the Docks and we will go inside a submarine. This level is a kind of labyrinth and we have to turn few switches to get the access to the scrolls. Zone D is a Market and it if pretty frantic action here, having to climb up the buildings.

All the game is connected using nicely drawn colourfull screens that connect the story with what is going on. This is really nice touch and keeps the will to play more.

Once we finish all four zones and all four big boss battles, we are ready to enter the residence of Paco Romita. The way here is straightforward with few doors on the way. Each doors lead to one of

the big bosses and we will have to fight all four of them again. After that, we finally meet the Paco himself. But beware, the game start easy, but it add more and more as we go through it,
so finishing it is far from being a simple task!



Zone D: The port

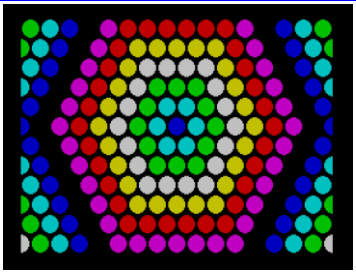
That was the gameplay, what about technical side of the game? Well, Churrera engine MK2 is used here. Graphics is really nice and it is easy to see what is going on. The only exception is a zone C where it need a bit of a practice to see which graves have to be jumped over. Also we get a sound effects and each zone have it's own music.
The game is for Speccy 128k only and cost 1,30 Eur (or more if you want). It is above average, with a good story telling where simple story connect everything together so the playing doesn't feel pointless. If you have not enough of platformers yet, go for it.
The link to buy the game is:

https://greenwebsevilla.itch.io/ninjakul-2-the-last-ninja

DEMOSCENE 2019
VON ELLVIS

2019 was a great year if we take a look into the deep waters of demoscene. The amount of releases and, most importantly, it's quality was high and just to make a list of what is worth to watch is quite long. Let's take a look on what you should run on your Speccies.

»OPART« – *G0BLINISH*



»G0blinish« is most active person on a Spectrum demoscene (and one of the most active people in the whole demoscene) and although his work is not the most original or attractive, I have to recommend his 256 bytes intro from *»diHalt Lite«*. On one side it is simple attribute change, but together with a nice pattern and good colour choices it is very pleasant for an eye. It's length is also a good achievement!
download (tr-dos image only) at:

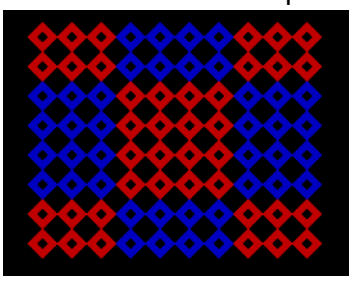
https://files.scene.org/view/parties/2019/dihaltlite19/lowend_intro_256b/g0blinishopart.zip

»CAFE 2019 INVITATION« – *QBONE*

»Q-bone« is a group that is not releasing huge demos, but often they focus on one effect and good design. Their invitation intro for *»CAFe 2019«* is exactly that. Together with a good music it is nice one-screen demo to watch. Another fine entry from *»DiHalt Lite 2019«* demoparty.
download (tr-dos image only) at:

https://files.scene.org/view/parties/2019/cafe19/cafeparty_2019_invitations/cafe_2019_invitation.zip

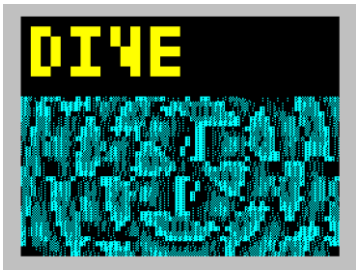
»JOPHAR« – *SHADOW UND YERZMYEY*



This demo is a bit special. Although visuals are basically just attribute changes, it is tightly synchronized with the music. And the music is of usual Yerzmyey's standart. It is great example of a clever use of attributes and show how few it need to create a good looking demo. It took first place on *»Gerp 2019«* in oldschool demo cathegory.
download at:

http://ag1976.com/files/Jophar.zip

»DIVE« – *AGENDA*

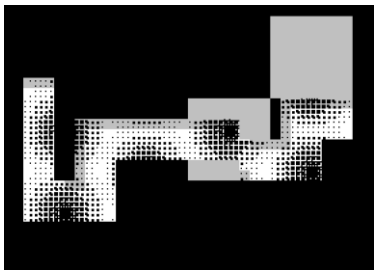


March means always a *»Forever party«* and year 2019 was really strong one regarding the releases. I would like to point your attention onto 3rd place in *»1k intro competition«.* There are two reasons for it. First, after a short pre-calculation you'll get a very nice chunky animation of interfering circles. It is smooth and there is even a simple sound to it. Second reason is that the author,

Gorgh of Agenda, is an Atari coder from Poland and this is his very first production for Speccy. The quality is high, let's see his future production!
download at:

https://marek.oglodek.name/img/dive.7z

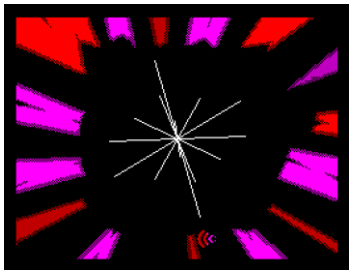
»Regression« – *MBorik*



Now we have something special here! It's not every day that we can see such a massive demo that run so smoothly and fast. It is perfectly synchronized with the music and take care very much to not bore the audience. It was real shock on the *»Forever party«* and there is no doubt why it won the whole *»Wild Demo Competition«*. Being unusual in visuals, it is also unusual in it's hardware needs, the demo run correctly on a Spectrums with 512k of memory. You don't have one I hear you? Well, Speccy with MB02+ (or MB03+) will do the job. If you own *Spectrum Next*, it will work there too.
download at:

https://github.com/mborik/regression/releases/download/final/nag_regression_2019.zip

»Badaboom« – *Gemba Boys*

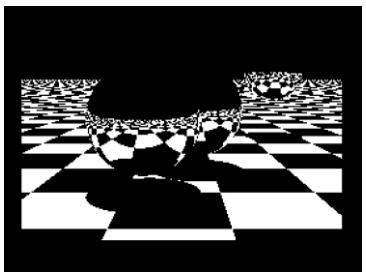


»Gemba Boys« haven't missed the *»Forever party«* and took a second place with their *»Badaboom Demo«*. It is their usual standard production, this time they got some help also from *»Gasman«* and *»PG«* (an Atari guy). The theme is inspired by movie *»5th Element«*. A joke from C64 scene took an applaud on the party place, that is the real scene spirit!
download at:

http://www.noblnoch.net/download/dema/gemba/badabooom.zip

»TicToc Intro« – *Nagydani*

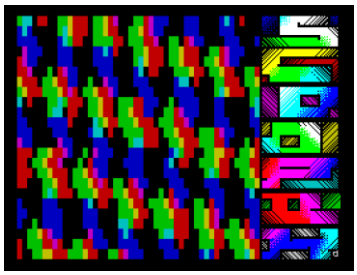
»Forever party in 2019« was full of surprises. What we have here is 1st place on *»1k Intro Competition«* and I have to say that it shocked everyone on the party place and it keep doing it till today. It is a raytraced animation done in just one kilobyte. The downside is that the pre-calculation take four (!) days, so it is not practical to watch it on the real



Spectrum, but the results are just mind blowing. Anyway, you can download the intro and run it without waiting 4 days, it is a snapshot taken after the long pre-calc. There are no borders of what can be done on our old humble Speccy!
download at:

http://forever.zeroteam.sk/download/f20speccy.zip

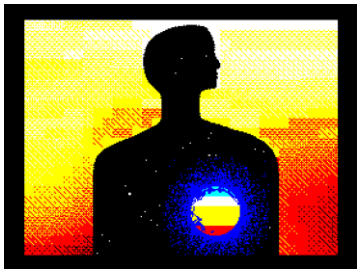
»70908« – *Scoopex*



Here is another demo that noone expected, like a flash from a clear sky. It is smooth, it is colourfull and it is fast. I am still a bit unsure what more to say, just go and watch it, it's worth of every second it take. Some well-known names worked hard on this and it is worth winner of Forever's 1st place in *»ZX Spectrum Demo Competition«*.
download at:

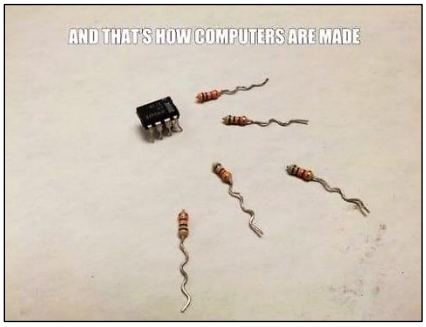
https://files.scene.org/view/parties/2019/forever19/zx_spectrum_demo/scx70908.zip

»Oxygene 7« – *Stardust*

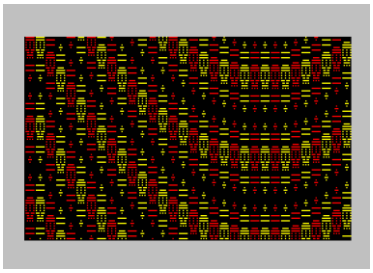


After all the heavy stuff we've just seen it is time for a bit of relaxation. 1st place of demo competition on *»Speccy.pl party«* in 2019 was taken by this small piece of demo that is very pleasant to look at and won't grab us out of this world. One screen with plasma, stars and a rotating Earth is all we need to look at while listening to the good music! Download at:

https://files.scene.org/view/parties/2019/speccy_pl19/zx_spectrum_demo/zx_demo_stardust_oxygene7.zip



»Erzac« – *Speccy.pl*



Polish demoscene in recent years is active again and although days of *»Shock Megademo«* are long gone, the quality of today's releases from Poland is of high standard and always worth to watch. *»Erzac«* is 4k intro that contains a good music, a couple of great effects and a good design. Overall feeling from this small production is much more of a demo then of 4096 bytes of programming.

Download at:

http://speccy.pl/archive/dl.php?plik=eace65b6dbebe6dcab99d6ecb4754725

»Die Brexecutable Music Compo is over« – *Hooy Program*

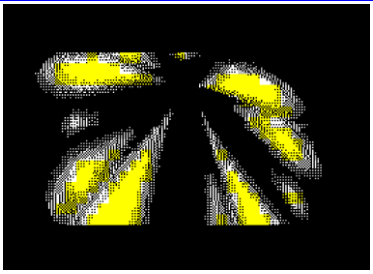
»Gasman« is already a legend in the waters of the demoscene and he still keep showing why.

On »Revision 2019« he released an invitation to *»Nova«* - the *»Sundown demoparty«* succesor in the UK. And because it is *»Gasman«,* it is funny (although with a serious point), clever and simple. The music is well known, the message is clear and the demo is one of those that go never boring. Since your English is a bit beyond basic, you might want to check out this clever little invitation!

Download at:

https://files.zxdemo.org/f/201904/hooy_program__the_brexecutable_music_compo_is_over.zip

»Megademica 4K« – Serzhsoft

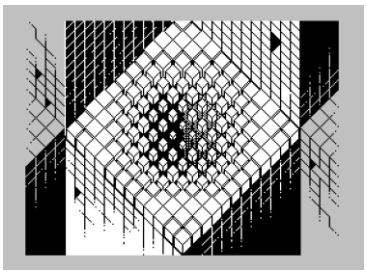


»Serzhsoft« is the main reason, why *»Forever party«* never had a 4k intro category. And now on *»Revision 2019«* he released his *»Megademica«* and won *»Oldschool Intro Competition«*. Why? Simply because the name is correct. It is 4096 bytes intro running over eight minutes and showing a lot of various effects. At the end it really feels like a megademo. This is exactly what I would call a black magic.

download at:

https://files.scene.org/view/parties/2019/revision19/oldskool4kintro/mega4k_party_0.zip

»Cube One« – QBone



Here is another *»One screen demo«* from *»Q-Bone«*. It was released at *»DiHalt 2919«* and ended up 3rd in a »Wild Demo Category«. It is interesting by drawing isometric cubes, the patterns are wisely chosen and overall look is good. It is a nice to watch demo with good music.

Download (tr-dos image) at:

https://events.retroscene.org/files/dh2019/Wild/cube_one.zip

»Karateka« – *Joker*

Dance is not a thing everyone can do (for sure not me). But watching someone else who actually can dance is fun. And when there is no one such around, there is this demo to load and run. *»Karateka«* is long (very long) animation of a karate guy dancing to the (good) music. It took 2nd place in *»Wild Demo Competition«* at *»Lost Party«*. It is colourful and smooth, a pleasure to watch!

Download at:

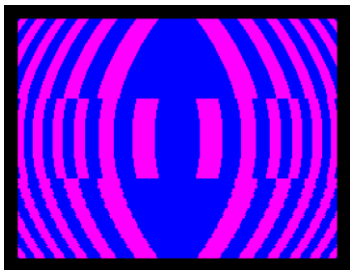
https://files.scene.org/view/parties/2019/lostparty19/wild/karateka.zip

»Theend« – *TheSuper*

»TheSuper« is a group that you should be watching. They do just one or two demos every year, but those are worth to see. A good mix of clever animations and real-time code, they deliver the essence of what the demo really mean. The name of this demo let me worry a bit, but luckily it was not the end of the group. It took 1st place on *»Chaos Constructions 2019«* in *»ZX Demo Competition«*. Download (tr-dos image) at:

https://files.scene.org/view/parties/2019/chaosconstructions19/zx_spectrum_640k_demo/theend.trd

»ABBATONE« – *ABADDON*

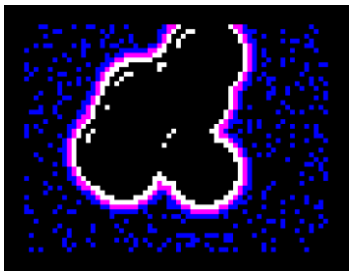


»Abbatone« is a 256 bytes intro that took 2nd place on *»CAFe 2019«*. What make it interesting is the fact that it is using the whole screen to draw animated patterns. And it do transitions between them (with a bit of nerve tearing sound junction). And a simple sound. *»Abaddon«* is not a group that release on the Speccy, mostly on MS-DOS, but they are worth to watch for any incomming productions!

Download at:

http://www.abaddon.hu/abaddon/ABBATONE.ZIP

»TIRATOK« – *DEMARCHE*

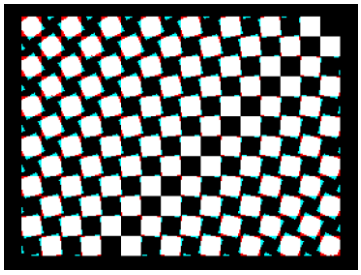


Well, the attributes may be restricting when we want to use colours, but for some people they are not. *»deMarche«* are such people and their demos are always so colourful that they look a bit like from another world. Often it's blinking a lot (that is the way to create more colours) but it is always a good synchronized with the music and the efects are strictly of hight quality. This demo took 1st place in *»ZX Demo Category«* on *»CAFe 2019«*.

Download at:

https://files.scene.org/view/parties/2019/cafe19/zx_spectrum_demo/tiratok_final_v2_by_demarche.zip

»GABBA« – *STARDUST*



In a way, this demo is a joke. Starting with it's name, »GABBA« is a mix of *Abba*, the music group, and *Gabber*, a kind of music. What we have here is a demo that is very carefully synchronized to the music. It feels more like a electronic video clip then usual demo. If you can cope with a lot of blinking, go and watch it, there is always a light joke in the air...

Download (tr-dos image) at:

https://events.retroscene.org/files/cafe2019/zxdemo/gabba.zip

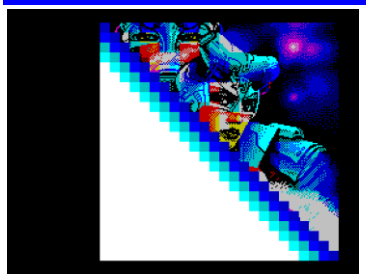
»ZX XMAS'19« – *ABADDON*

And we're at the end of 2019. This is a small festive demo with nothing special inside unless you're watching it on a computer with ULA+. It uses enhanced colours there. Also, pressing BREAK will bring you to the hidden part, not a thing happening in many other demos! Nice way to bring Christmas to the computer world.

Download at:

http://abaddon.hu/abaddon/zxXmas19.zip

»MAC GALLERY VOL 1« – *BATMAN GROUP*



»Batman Group« was well known on *Amiga* few decades ago. Then, as a sudden, they came back on *Amstrad CPC* few years ago with, now legendary, *»Batman Demo«* showing what *CPC* can really do. And now they are on the Speccy. *»MAC«* is known for re-drawing loading pictures for old games and now we have a slideshow of his works. Together with a nice music, this is great thing to watch to see what the Spectrum is capable of in the graphics department.

Download at:

https://ftp.untergrund.net/users/havoc/POUET/zx/MACGalleryVol1.zip

»STELLAR EVENT« – *RETROJEN*

This is the very last production of the 2019 year. It is a slideshow of multi-colour pictures. There is no music at all and you have to press ENTER to see next picture but it is really nice to see new graphic mode on the Speccy. It was originaly created by Gasman and here we have pictures from various people using it to draw some screens. Interesting thing on this production is the fact that it comes from Istanbul, Turkey. I cannot think of better closure of already great demoscene year of 2019!

download at:

https://retrojen.org/event/raat06/raat6StellarEvent2019.zip

GAMES 2019
BY THOMAS EBERLE

Hello all,
as announced, we have split the software sections a bit this time. I present you here a selection of the (in my opinion) best games from 2019 that are freely available.

»5 RINGS« – *SIMON DALY*

Not really a game, rather an interactive reading experience brought us Simon Daly. In the program, you read the story and occasionally make decisions that change the course of history. However, one wrong decision can bring you to nirvana. Fans of fantasy literature will get their money's worth, the story is exciting and entertaining. Unfortunately, the text is limited to only three lines, which then scroll through, which is a bit tiring. Nevertheless you should play it at least once. If you don't make it, then maybe a second time, but since the story is repetitive, it's not a pleasure you'll indulge in much more often. The graphics are very crude, but appropriate. Whether this is due to memory, the graphics being poorly converted, or Simon simply being a bad draftsman, I don't know. In any case, the story still comes across well.
Download:

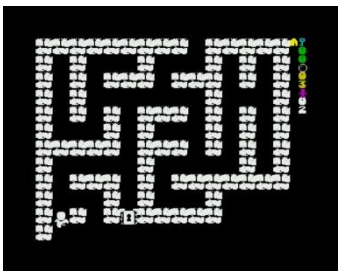
https://www.spectrumcomputing.co.uk/entry/35140/ZXSpectrum/5_rings_If_the_tap_file_loads_then_it_should_run

»AD LUNAM« – *ALESSANDRO GRUSSO*

From Italy this time comes a strategy game with completely new content. It's about the race to the moon between Americans and Russians during the Cold War. You start in 1955 and can spend the money you receive on various rocket programs, crew training, satellite technology or equipment. Of course, you need successes, otherwise the pressure will soon increase and you will be fired. Therefore, you should not try to land on the moon right away, but maybe shoot a satellite into space first...
The game works completely without graphics, all information is displayed textually and the selection is made with the corresponding button. The game is on the level of 1984, but this does not mean that it is bad.
It's fun and a bit different than another platform game, of which Alessandro has already given us many. Of course it could have been made more graphically elaborate, a menu with joystick control etc.. But at the end of the day, it's the way we know it from the past and it's fun. That's what matters.
Download the game:

https://www.spectrumcomputing.co.uk/entry/35151/ZXSpectrum/Ad_Lunam

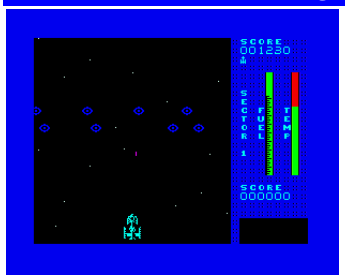
»ALONE IN DARK MAZE« – *DMITRY KRAPIVIN*



A maze game... once again. With the peculiarity that in this game you first grope in the dark. There is always only one area in the direction of view that is illuminated and you can then see in which direction you can go. The paths you have already taken remain illuminated, and in the darkness there are keys to which you have to find the hidden doors.
The graphics are monochrome (with some colour splashes on the right edge of the screen) and quite plain, but the AY sound is surprisingly good. The character is easy to control and it gets difficult when enemies suddenly appear out of the darkness and you barely have time to dodge them. I'm not sure if I really like the game, but at least I played it several times. I think there is still a lot in it, maybe you can even arm yourself. In any case you can have a look at it, it costs nothing.
Download it:

https://www.spectrumcomputing.co.uk/entry/35169/ZXSpectrum/Alone_in_dark_maze

»ASTROBLASTER« – *MATT JACKSON*



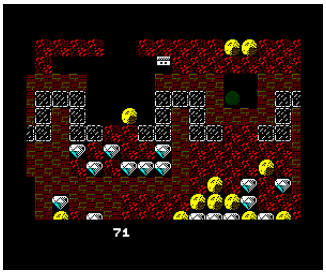
This baller game is a conversion of the Sega Arcade from 1981. In fact it takes you back to the early days of blast´em up games like "Space Invaders" and "Pheenix". You control the spaceship at the bottom of the screen on the left and right and fight against incoming formations of alien spaceships. Weapons available are the laser and a WARP. The warp only slows down the enemies, so that you can better avoid their shots and shoot down the enemies themselves. The warp can only be

used once per level and life. A level consists of several formations that all have to be shot down to get to the supply ship and refill energy. Care must be taken not to overheat the laser and run out of energy.

The game is an outstanding implementation of the original. There are a lot of different formations and spaceships. There were no bonus weapons in 1981 like in later games of this genre, but it is still a game that is fun and can develop a slight addictiveness. If you like to just shoot off in a classic way again, you'll get exactly the right thing here:

https://www.spectrumcomputing.co.uk/entry/35103/ZXSpectrum/Astroblaster

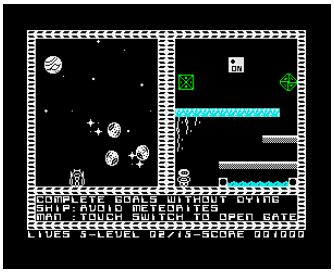
»Automated Cave Explorer« – *Alexei Borisov*



Since »Boulder Dash« the game principle is well known, dig tunnels, collect diamonds and watch out that nothing falls on your head. What is special in this game are the annoying wasps (or are they earth bumblebees), which are also in the ground and you should not get in body contact with them under any circumstances. If you meet one of these creatures, you should quickly flee, but if you dig a new tunnel, the pursuer will immediately follow into this tunnel and you are trapped. You can only stop the enemies by letting something fall on their heads. Therefore, you have to dig right away with strategy and prepare some traps for the retreat. There are different stones, some are fixed, some can be moved and some can be destroyed if you let a stone or diamond fly on them. The whole thing works at a pleasant speed, not too fast and not too slow. Sound effects are there, a sound unfortunately not. The graphics are rather above average for this game genre, but also not too elaborate. At most, it could have been tried in multicolor. A lot of fun for no money, definitely download:

https://www.spectrumcomputing.co.uk/entry/35164/ZXSpectrum/Automated_Cave_Explorer

»Being Left is Not Right« – *Carlos Pérezgrin*



A platform game and space shooter in one? How can you combine that?

Quite simply. Your friends are scattered everywhere. Collect them with the spaceship. But your friends have to help and open doors. You play simultaneously on the left and right half of the screen. While on the left you try not to crash the spaceship into meteorites, on the right you hop through the level and try to reach the switch that opens the door for the spaceship. Once this is done, the spaceship only has to pick up the brave little man.

If you can't multitask, just play the game in pairs. Joystick options are not selectable, the game is only played on the keyboard. This doesn't detract from the fun, individually the game is easy, the combination makes it more difficult.

I think the possibility to play a game in Paris is a good idea, although it could be done better. While the animation works, the graphics are on a very weak level and mostly monochrome. A bit more colour would certainly have done well. It's worth mentioning that the game only runs in 48k mode, but if you have a 128k machine and use the USR0 mode, you can enjoy a good AY soundtrack during the game.

If you want to test your attention and reaction or have a second player at hand, give it a try:

https://www.spectrumcomputing.co.uk/entry/34815/ZXSpectrum/Being_Left_is_Not_Right

»Block Dude« – *g0blinish*

A mind game of a special class. First of all, you just have to get to the door. There are two problems. First, you can only climb over one block at once (about the size of your own man, so it's quite realistic) and second, although there are blocks you can carry and stack on top of each other, you can only carry one at a time. So you solve the levels by stacking the blocks in the right order to get to the goal.

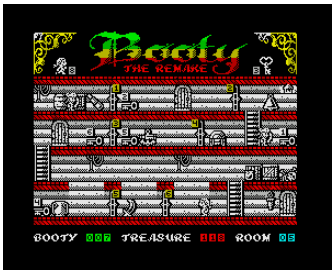
If you're puzzling over how to pick up a brick.... just press the joystick down when you stand in front of the stone. Press down again when placing stones.

The graphics are monochrome, but good use of shading gives the impression of multiple shades of grey. Very well done, nevertheless some colour would not have hurt in the outdoor area. The player moves very jerkily. The whole screen is scrolled in blocks, and the man moves in the same way, with one block corresponding to exactly two attributes, so it's much jerkier than usual games that only scroll one attribute. However, the controls are more precise this way, and you practically never stand wrong. The controls are precise and accurate, and the difficulty is challenging, at least for the levels in the test, but doable. If you get stuck, you can restart with the "R" key. The game is accompanied by a short

but catchy soundtrack. All in all, once again a game that can keep you busy for days. Even switching off and continuing the next day is possible thanks to the level code. Feel like puzzling? Download from:

https://www.spectrumcomputing.co.uk/entry/34912/ZXSpectrum/Block_Dude

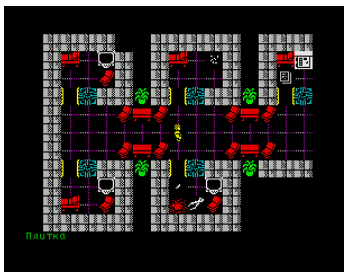
»Booty the remake« — *SalvaKantero*



Why always reinvent the wheel? »Booty« was a hit back in the days, the game where you had to collect the keys in the right order and put them in the right door lock to collect the treasures. Now, over 35 years later, the game has been pimped up a bit and given new graphics and a nice AY sound. Clearly, graphically it's a step up, but it's also one of those examples of why better graphics don't always make a better game. The keys and doors are marked with small numbers, so that you can find the right door for the respective key. However, these numbers are not necessarily easier to see with the background graphics. All in all, playing the game was very tiring for me, since you had to look very closely. The AY sound is really good, though, and generally the remake isn't bad. But it's not better than the original. By the way, the original had a bonus game as a gag, if you had a »Currah Microspeech« plugged in. Since I don't have one, I couldn't test it, but I assume that this extra is missing in the remake. Nevertheless, who wants to have a look at it:

https://www.spectrumcomputing.co.uk/entry/34682/ZXSpectrum/BootyThe_Remake

»Cell3326« — *Wanderer*



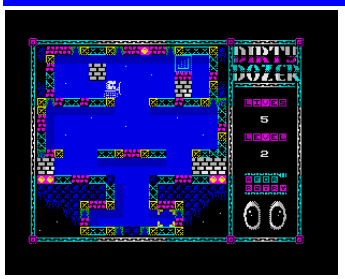
This game from Russia has the aggravating factor that it is in Russian and I can't read the Cyrillic characters. But as it looks, you have to break out of a prison. Due to the lack of instructions, I tried everything and found out that you have to break the TV to get a sharp tool, which apparently can be used to trick the door mechanism. So you can already see that it gets complicated.

Besides the fact that Russian texts are not readable for me in the game, I sometimes can't make out the meaning of small things and therefore can't guess what you can do with them. So the only option is to try everything until I found a solution.

I like the idea well, and also the graphics are colourful and detailed, but the screen is not filled beyond recognition with background graphics. The main character moves cleanly, if only slightly animated, the atmosphere is exciting. I can recommend it to anyone who knows Russian, which should be a lot easier. All others who like to puzzle can of course try their hand at it:

https://www.spectrumcomputing.co.uk/entry/34717/ZXSpectrum/Comeme_el_Chip

»Dirty Dozer« — *Miguetelo*



The little bulldozer has to push a box to the finish line. What sounds like the millionth "Sokoban" clone, however, is not one.

First and foremost, the bulldozer has to make space. Everywhere in the levels are walls blocking the paths, these must be flattened. Since it's a platform game, we're lucky that our bulldozer can also hop. But even that doesn't help him over every obstacle, so forward thinking and planning is necessary to make sure the crate arrives safely.

You can imagine that I wasn't thrilled at first, because it looked like a typical platform game. In fact, it's relatively easy to understand. All the action is on one screen only, so it's quick to keep track of. From a tactics point of view, it makes sense to first run down everything and clear the obstacles out of the way. But be careful, you may not be able to hop up as far to get the crate, so better throw it down first. Also important: if you go out of the screen on one side, you come back in on the other. But only if there is no obstacle...

I always test games briefly, if I don't like them, I don't write about them. But here I really stayed longer, it's fun. The graphics are really colorful and yet not overdone. Everything remains well recognizable. The game also has an AY sound, but it gets annoying in the long run and can be turned off. Tricky games are better played without sound. Absolutely recommendable, get it from:

https://www.spectrumcomputing.co.uk/entry/35124/ZXSpectrum/Dirty_Dozer

»Comeme el Chip« - *Beyker Soft*

From Spain comes this strategy game, which at first glance looks like a simple maze game. But the maze is not the problem, it's to get the whole thing in the right order. There are fields that are marked with an arrow

and can only be traversed in this direction. Then there are fields that can't be crossed at all, and there are bombs that can be used to blast away just these non-permeable fields. But the bombs have to be collected and there are only a few of them. Precise planning is therefore necessary to walk the fields in such a way that all the keys can be collected, only then will you get through the door to the next level.

The game is simple and easy to understand. The graphics are good, but a bit small. Great animations and effects should not be expected, surprisingly good is the voice output, so you are denied access to the door without a key with a "Ne ne" from the Spectrum. A nice gag and not the only voice output.

Graphically not a masterpiece, but fun and tricky. Download at:

https://www.spectrumcomputing.co.uk/entry/34717/ZXSpectrum/Comeme_el_Chip

»Drift« – *Zosya Entertainment*

A car racing game for the Spectrum in 2021... incredible. In racing games it is usually just quite seenable, that the Spectrum has its limits and so in my eyes already since the 90's with »Gran Turismo« that the Spectrum just couldn't keep up.

Also conversions like »Hard Drivin«, »Test Drive« or »Outrun« were just not as good on the Spectrum as on other systems, mainly because there were already 16-biters like Amiga or Atari ST at that time. So I'm looking skeptically at »Drift« and I'm definitely surprised by the presentation. The whole thing needs a 128k computer and offers a preamble and story. It's not just about racing, you also have to score points to buy better equipment or a better car. More of a challenge then. The racing course is only against the time. Extra points, which are not insignificant, are awarded for drifting, that is, for slipping slightly with the rear tires in the corner. You do this by making a slight swerve, then entering the turn strongly and accelerating. This also works after a short practice phase, only then it becomes noticeable that you have a Spectrum. The graphics of the racetrack are quite simple with cones on the left and right, and you soon don't know where you have to go at all. Fortunately, an arrow at the top right shows you when you're going in the wrong direction, but it's confusing. After three laps you're at the finish and get points... or not.

Despite the great presentation of the opening credits and although the vehicle, the animations and the graphics in the background are really very good graphics, in the game itself it's easy to lose track because the road just doesn't have a different colour than the surroundings. I fully realize that this is difficult to solve on the Spectrum with attribute clash, but unfortunately some of the gameplay is lost this way. Nevertheless, it remains an unusual game with an elaborate concept that you should definitely take a look at:

https://www.spectrumcomputing.co.uk/entry/35158/ZXSpectrum/Drift

»Glazx« – *EugenyN*

First person shooters on the Spectrum look a bit different...

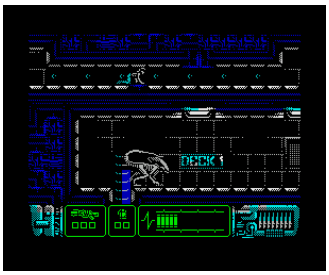
»Glazx« shows nice multiplayer action, so two players, from 2D perspective.

Each gets a character and a number of shots. You choose the environment and off you go. It's all about speed and precision. If you are hit, you only lose one life and can't be hit again right away. So you can get to safety. There are bonus ammunition and also long-range missiles that always hit. Unfortunately, I could only play the game alone in the test. The action is fast, the graphics simple but sufficient and sounds are limited to theme tune and effects. Actually it's a quite simple game, but it's definite: at the next Spectrum user meeting there will be a competition with this game. So practice already:

https://eugenyn.itch.io/glazx

The 48k and 128k versions differ only in sound.

»Aliens Neoplasma« – *SaNchez*



Aliens... memories come up. There have been two Alien games on the Spectrum before, both were actually quite well done.

What will this third release bring us? At first, in any case, no disappointment. The game offers great graphics, suspense, action and a high but not demotivating difficulty level. You slip into the role of Lieutenant Ashley (wasn't her name Ripley?), who wakes up in the spaceship and suspects that something is wrong. Possibly, various blood stains give her this idea.

First of all, you have to look around. Soon you discover very well done aliens, but also the unloved "facehuggers" wander through the corridors. The character can run, hop, climb and crawl. Unfortunately, so can the "aliens". The first thing you should do is arm yourself,

and the next thing you'll realize is that the aliens are damn fast and a simple rifle won't do...
In the test I didn't get too far, the aliens appear surprisingly and are very nimble. But the good thing is, you don't always have to start over, you always come back to life at the last point you reached.
The tension is really very high, especially because of the element of surprise. Although the aliens always move in the same way, they also pursue once they have spotted you. The computer can give you hints, but you can only help yourself. In space, no one can hear you scream....
The game was once a commercial release. Since it is now two years old, you can buy it for 0 Euros, but it remains a purchase. Who has strong nerves:

https://zxonline.net/game/aliengame/

SOPHIA II – *ALESSANDRO GRUSSU*

»Sophia« is back!
Two years after defeating the evil wizard *Yojar*, *Sophia* is plunged back into adventure by *Alessandro Grussu* and must once again pull over the robe and protect *Xixerella*. The *Inner Light Society* serves as a cover for the »*Grim Reaper*«.
The game is divided into three levels - a dungeon, an underwater passage and the Dark Tower where the villain resides.
The dungeon is populated by monsters, of course, and the exit is guarded by the Spider Queen. In the underwater passage Sophia has to face the »Giant Seahorse« at the end and in the Dark Tower she then faces the »Grime Reaper«. As always, there are deadly enemies and magical doors that must be opened to clear the way ahead.
After the first and second level, the player receives a code to continue the game at a later time. The game has two different endings depending on the difficulty level chosen.
Alessandro Grussu delivers the game again in eight (!) different languages including instructions. In addition, the game files come in the form of TAP, TRD and TZX variants.
Controls:

- Sinclair-/Kempstonjoystick, keyboard

Keyboard layout:

- **o** - left, **p** - right, **q** - up, **a** - down, **m** - fire, **h** - pause

Conclusion:
»Sophia II« is a really good game, even though some may think that all AGD games look the same because of the limitations. Sure some things are repetitive which is inevitable, but programmers like Alessandro Grussu deviate from that as they still create games with an enormous variety.
These games are also not comparable to the Mega-Games from the 80s, which had large teams and budgets. Therefore, games like Sophia II are absolutely terrific with their great graphics and excellent music.
Download at:

https://www.alessandrogrussu.it/Sophia2.html.

(Jungsi)

LAETITIA – *JAMIE GRILO*

The author *Jamie Grilo* is no stranger to the Sinclair Spectrum. He has delivered a masterpiece with the game Laetitia. *»Laetitia«* chronicles the adventures and misadventures of a sexy little witch who must help her aunt make a potion that can defeat the evil witch. In any case, what makes the game special is that it consists of four (!) parts, with each part taking full advantage of the AGD. The four parts can be played independently of each other, but this is not recommended, otherwise the story is difficult to understand.
The great loading screen was created by Andy Green, who was inspired by the original drawing of Lucy Fidelis. Jamie created over a hundred screens for the game!
Story:
As mentioned before, the main character is the young and sexy Laetitia, who comes to the aid of the small village of Grynnet, which has been bewitched by a witch named Grizelda, and puts the village at her service. Only Runella, an old sorceress, and Ordentur, the wise old man of the village, escaped the curse, as they both lived in the most remote part of Grynnet and managed to hide. Runella is already old, but she can rely on her young niece Laetitia, the heroine of the story. Laetitia does not have her aunt's wisdom, but she is fearless and helpful and does not hesitate to help.
Knowing that her niece is not yet able to face Grizelda, Runella consults her old book of potions and finds one that greatly increases Laetitia's powers so that she can use it to defeat Grizelda. Thus, in the first three parts, Laetitia must gather the necessary ingredients for the potion, always counting on the help of the wise old man. In the last part, Laetitia will face Grizelda in her fortress, with the plot being a bit different from the previous parts.

Note: although the sorceress's aunt and the wise old man provide very useful tips throughout the game, it is not advisable to refrain from reading the complete instructions for each part. Otherwise, the player may get stuck without knowing what to do. Apart from the information about the ingredients to be obtained and the places where they are located, the order in which the items are to be obtained or whether certain actions are required is also given. Unlike some of Jaime's other games, Laetitia is not a *fast* game, but an arcade adventure, with objects that must be obtained before moving on to other parts of the scenario, levers that must be manipulated, and a number of other elements common to this type of game.

In some screens, a good eye is important so that the ingredients that are important for the aunt aren't missed. In addition, sometimes there are evil or wrong ingredients that don't help Laetitia and drain her energy. The little witch also has a few tricks up her sleeve like flying on a broom (except in caves) or making big jumps. Of course, she also knows spells that only affect certain enemies. Bats and carnivorous plants can be immobilized for a few seconds.

The scenario consists of two parts. Thus, on the surface there is the forest, the aunt, the wise old man and the huts that provide access to the caves. For each of the huts a key is needed, which is provided by the old man after completing the tasks. In the caves you can find the ingredients required by the tange or other items for the old man.

Controls:

- Sinclair/Kempston joystick, keyboard.

Keyboard mapping:

- Q - up/house, leave cave or room.
- A - down/enter house, cave or room
- O - left
- P - right
- M - fire magic spell
- SPACE - jump
- H - pause
- jump + up = jump higher
- In pause mode: down = leave game

Conclusion:

Laetitia is very varied which is not always a given in AGD games. Besides the difficulty, the graphical aspect has also improved in this game by Jamie. The scenarios are quite imaginative, but the sprites are now better designed than in his previous works. *Flox Fluffy's* music, with several melodies, is able to maintain the high level of the game.

Download:

https://jg-spectrum.webnode.pt/l/laetitia/

(Jungsi)

Commercial Game

Dead Zone –

(c) 2019 – *PCNoNoGames*

This is a game for those who are in the mood for an alien shooter. »*Dead Zone*« was launched by the Spanish developers of »*PCNONOGames*« and costs €2 as a digital download. The game offers two game modes, five missions and three ways to shoot.

The story is quickly told - the main cities of the Earth are invaded by UFOs that abduct all the living beings they find. Every place they devastate becomes a *DEAD ZONE*. You must save the population of the cities and prevent them from being abducted by UFOs. To do this, you'll have to finish off all the enemies.

The two game modes differ only slightly - in the Control Point variant, a section must be completed in order to restart at the last Control Point reached if all lives are lost. In the Survival version, the player always starts from the very beginning.

It is not only necessary to save the population, but also to keep an eye on the fuel level and the engine heat, whose statuses are displayed on the right side of the screen. Reserves can be renewed by collecting equipment on trucks that appear at the bottom of the screen.

Controls:

- - Sinclair/Kempston joystick, keyboard.

Keyboard mapping:

- - q - up
- - a - down
- - o - right
- - p - left
- - space - fire

Conclusion:

Dead Zone can best be described as a mixture of Space Invaders and Operation Wolf. Very simple and yet it can be addictive. The music is also really catchy.

(Jungsi)

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